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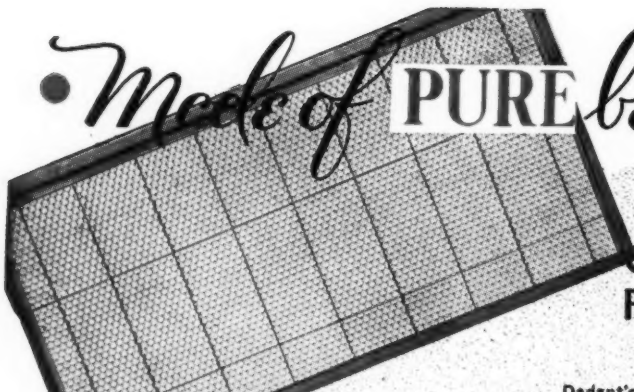
Gleanings in Bee Culture

November 1954

XUM

Made of PURE beeswax



DADANT'S CRIMP-WIRED FOUNDATION

Dadant's Crimp-wired Foundation (in fact all of Dadant's Bee Comb Foundations) are made of pure beeswax. This is important. Various attempts have been made to harden or toughen or sheer up pure beeswax in order to avoid the use of mechanical supports such as are used in Dadant's Crimp-wired Foundation. However, remember beeswax is a basic raw material which goes into many products and has many uses.

Industry demands purity and refuses known mixtures. Remember, too, that the beeswax in comb honey whether in section or in bulk is actually a food because it is a part of the honey. Therefore, any mixing of other waxes with it is absolutely an adulteration.

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- Milled to exact measures
- All cells just alike
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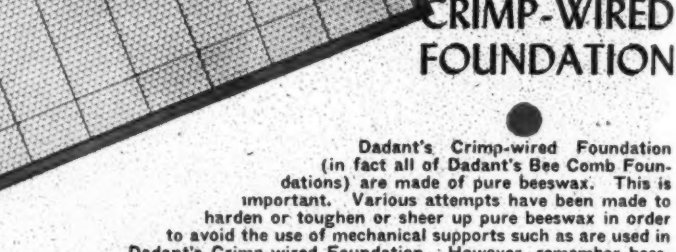

FIG. 1 — Pure Beeswax: fleecy flakes, thin bars

FIG. 2—½% carnauba wax: large, clear, bright burrs

FIG. 3—1% carnauba wax: smaller, bright burrs, tiny stars

FIG. 4—2% carnauba wax: large number burrs and stars

FIG. 5—5% carnauba wax: countless tiny brilliant crystals

COMPARATIVE MICROPHOTOS of Pure Beeswax and four stages of wax adulteration.

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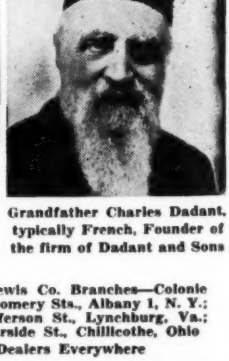
Chas. S. Engle, Beeville, Texas.



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Gleanings in Bee Culture

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Monthly HONEY Report

United States Market

The following figures represent an expression of current prices from beekeepers and honey packers over the country. They are based on several reports from each state averaged with the reports in the region. Where insufficient information is returned, prices have been omitted from the chart. Where three figures appear on the chart the first figure represents the low, the middle figure represents the average, and the third figure the high price in cents per pound. Where only two figures are used the low and high are shown.

	North & South Atlantic	South Central	North Central	Midwest	West
Bulk Honey:					
Table Grade	12½-13-15c		12 13c	12½ 13c	11½-12-13½c
Baking Grade	11 14		10 11	10 11½	9½-11-17
Price to Grocers:					
5 lb. jar - can	16-20-26	20 35	14-18-21		16-18½-20
2 lb. jar - 12's	20-26½-32½	17½ 27	20-23-25		20½-24-25
1 lb. jar - 24's	22-27½-35	27-29½-35	23-25-27		22-25-27
Comb Honey:					
Cs. of 24 Sec.	$8.40-9-11		$8.20-8.40		
Retail Price:					
60 lb. can	15-16-20	20 20½	15-17-22		15-17-20
5 lb. jar	20-27-35	23-30½-40	20-23-26		18-23-25
2 lb. jar	32-40-54	32½-35-40	26½-30-33	27½-30-35	26-30-36
1 lb. jar	31-35-45	35-38-40	30-32½-35	30-34-39	33-34-39
Honey Sales:	Fair	Fair	Fair	Fair	Fair
Estimated Crop:					
Conditions based on normal %	70	62	75	72	83

A few comments are as follows:
"No fall flow. Dry in this area."—Kansas.
"Still dry in North Alabama. Prospects poor for remainder of season."—Alabama.
"Good rains recently."—Tennessee.
"Only commercial producers have honey at present. Believe price will go higher soon."—Tennessee.
"Beekeepers askng two cents above last year. Abundant moisture makes outlook excellent for 1955."—Wisconsin.
"Large amounts of rainfall have put legumes in fine shape."—Minnesota.
"There is no fall crop around here."—New York.
"There is a tremendous variation. We will feed all bees. Eastern New York appears good."—New York.
"Very poor fall crop. Much feeding is necessary."—New York.
"Many reports of bees in starving condition."—Oregon.

Canadian Market

(Unless otherwise specified, all quotations are for cases of No. 1 white.)

HALIFAX: Mkt. steady.
N.B. & Ont. past., paper,
24/2's $12.50
24/1's 6.50
SAINT JOHN: Mkt. steady.
Ont. past., glass,
24/16-oz. ..... $ 7.80
paper,
24/1's 6.90
24/2's 12.25
MONTREAL: Mkt.. firm.
Que. White, metal,
24/2's $10.75-11.50
12/4's 10.50-11.00
glass,
24/8-oz. 4.25- 4.50
24/16-oz. 6.25- 6.75
Dark, metal,
24/2's 6.50- 6.75
OTTAWA: Mkt. steady.
Ont. past., paper,
24/1's ..... $ 5.75- 5.80
metal,
24/2's 11.40-11.90
12/4's 11.65-11.70
Golden, metal,
12/4's 8.10- 9.75
Amber, metal,
12/4's 8.50- 9.75
Man. White, metal,
12/4's 11.75
TORONTO: Mkt. firm.
Ont. past., paper,
24/2's $10.75-11.50
24/1's 5.95- 6.25
glass,
24/16-oz. 6.75- 7.00
Amber, paper,
24/2's 8.00- 8.25
Dark, metal,
24/2's 7.50- 7.75
WINNIPEG: Mkt. steady.
Man. metal,
24/2's ..... $ 9.80
12/4's 9.30
past., paper,
48/1's 11.35
24/2's 10.50
REGINA: Mkt. steady.
Sask. metal,
12/4's ..... $ 9.85-10.00
48/1's 11.55-12.00
metal,
24/2's 11.20-11.35
12/4's 11.00-11.05
6/8's 10.85-10.95
SASKATOON: Mkt. stronger
Sask. metal,
24/2's $10.15-10.35
12/4's 9.75- 9.95
6/8's 9.50- 9.65
past., paper,
48/1's 11.40-11.50
metal,
24/2's 11.20-11.30
12/4's 10.85-11.00
glass,
12/1's 3.75- 4.00
EDMONTON: Mkt. steady.
Ont., Man., past., metal,
12/4's $10.80-10.85
Sask., metal.
24/2's 9.80
Alta., past., paper,
48/1's 12.20-12.85
B.C. liquid, glass,
12/1's 4.60
CALGARY: Mkt. steady.
Alta. metal,
12/4's $10.90
6/8's 10.40
past., paper,
48/1's 11.00-11.25
24/2's 11.40
metal,
12/4's 10.90
VANCOUVER: Mkt. steady.
Alta., past., metal,
24/2's $12.95
12/4's 12.60
ctn.,
48/1's 13.00
24/2's 12.60
B.C., unpast., ctn.,
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1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: The A. I. Root Co., Medina, Ohio.

Editor: M. J. Deyell, Medina, Ohio.

Managing Editor: M. J. Deyell, Medina, Ohio.

Business Manager: Alan I. Root, Medina, Ohio.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

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5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

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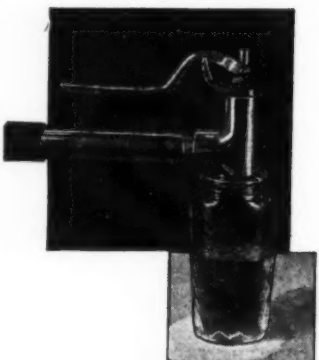

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Beekeeping in Singapore

by LIM CHOO KIAT, Manager Lee Apiaries, Singapore

The Lee apiary near Singapore.

I BECAME interested in bees at a very early age. When I was still a student in the Anglo-Chinese College in Foochow, China, I had a classmate whose father was an apiarist and very often I would visit my friend's house and see his father at work. The methods employed by him were, no doubt, according to the present standard, old-fashioned.

Besides what I saw at this old-fashioned apiary, I used to read plenty of books and magazines on beekeeping. Putting into practice what I saw and read, I started my own apiary in Singapore in 1929.

I was then staying on an island, known as Pulau Serangoon, about half an hour's motor-boat journey from the northeastern coast of Singapore Island in the Straits of Johore.

Starting with only two hives in 1929, I had 85 in 1939. The "Singapore Apiary" as I called my bee farm became so well known and popular that visitors from all parts of the Island and from the Malayan Peninsula visited the apiary to see how it was run. Even government officials were interested in my apiary. The honey which I produced was sold under the popular trade mark "Flag Brand C. K. Honey", and I received orders from as far away as Saigon where importers used to buy up to 5000 pounds of honey at a time.

All the bee appliances used on the apiary were made locally except one standard ten-frame hive which I ordered from the United States as a model for copying. I had to make the appliances locally as freight charges then were very high, and I could get the same appliances made here at a much cheaper cost.

Bees Destroyed in War

Everything was going on well. Then came the Japanese war in 1942 and Singapore was occupied by the enemy. I had to evacuate with my family to escape the Japanese, and when Singapore was liberated I returned to my apiary to find that there was nothing left of it. The Japanese soldiers in trying to steal the honey must have been stung and in their anger destroyed all the hives by burning them.

I lost everything I had, but it needed more than the Japanese to dampen my spirits.

A few years after the liberation I was given an offer by the government to take charge of an apiary in Cameron Highlands, a hill station in

Two bee eaters on the cover of the hive shot by Soh Siang Kok.

Swarms of Apis India (local bees) clustered on Mr. Siang Kok's chest.

Malaya, 5000 feet above sea level. I was then 60 years old and as the climate at Cameron Highland was far too cold for me I had to refuse the offer.

Then one day a big financier approached me with the request that I start another bee farm in Singapore. He agreed to finance me. The result was the birth of the $30,000 "Lee Apiary" which includes a 50-acre newly-planted fruit orchard.

Started with a nucleus of 25 hives imported from Australia in September, 1951, the "Lee Apiary" has today 100 hives and produces eight to ten thousand pounds of honey in one season. Like the "Flag Brand C. K. Honey", "Lee Apiary Pure Extracted Honey, Section Comb Honey, and Chunk Honey" are meeting with great success and all produce from the apiary is readily sold in our local market.

Eleven hives have already been sold to Sandakan, Johore, Malacca, and Penang and a few have been sold locally.

I must say that I have been very lucky in all these years not to meet with any serious disease or loss, except the diseases known as "disappearing disease" and "dysentery", which were due to inexperience, at the beginning, in feeding the bees with pure sugar without mixing with 50 per cent honey.

Bee Enemies are Serious

THE WORST local bee enemies are the philipine and the green bee-eater birds, the giant red ants, the hornets, and the wasps.

The philipine and green bee eaters usually come in groups of 15 to 20 and at times even in groups of hundreds. The only remedy is to apply for guns and shoot them down. Each bee eater can kill hundreds of bees a day. Philipine bee eaters come during October and remain till January, and then by February and March the green bee eaters will come in and get mixed with the few remaining philipines; but by April till July only the green bee eaters will be found.

While the giant red ants, the hornets, and wasps do their worst when the bees are busy gathering their nectar and pollen during good honey flows, I had to use arsenic in syrup to kill the giant red ants and pay boys in my district to hunt an area of three miles around for hornet and wasp nests at 50 cents per nest which I finally destroy by burning.

Other local bee enemies are the lizards, cockroaches, frogs, dragonflies, robber flies, etc.

Eleven others took up beekeeping seriously at the same time as I, but they all failed. Their failure could be attributed to these bee enemies, also to lack of patience and to not keeping

(Continued on page 657)

Pulverized sulfathiazole and American foulbrood

by R. O. B. MANLEY, Oxford, England

WHEN FIRST Dr. Haseman and then others put forward the treatment of AFB by the use of sulfathiazole fed in syrup, I was led to give it a trial. In one of my apiaries we found foulbrood in three or four of the hives year after year, and as we became quite fed up with destroying such colonies, I applied to the local inspector to have a look around and see if he could find where the infection was coming from, which he did; and meanwhile I decided to give the sulfa a thorough trial.

So these colonies were heavily fed with syrup medicated with sulfathiazole five half gram tablets in two gallons of syrup. To my astonishment the disease quickly and completely disappeared. However, I quite expected that as soon as the bees fell back on the stores that were sealed in the combs at the time the treatment began, the disease would reappear. But nothing appeared, no foulbrood was to be seen either that fall or during the following season. And, apart from one colony that became queenless during the following winter and petered out, all treated remained quite sound and are so still. That was in 1948.

After that, when occasionally a foul colony turned up, if it was strong we treated it in the same way and the treatment was a complete success in all cases but one, in which the drug seemed to have no effect at all. Probably this one was of a strain that was constitutionally susceptible. At all events it was burned and done with.

Two years ago I discovered AFB in a rather weak stock in an apiary of 32 and was fool enough to feed heavily with sulfa-medicated syrup. The case was a bad one; but there was a flow going on and I thought I might risk it without isolating the colony. However, I was wrong, which shows that even old hands are silly sometimes. That stock was completely robbed out. Of course, the feeding attracted attention of other colonies which cleared out every particle of honey and syrup in that hive.

There were two gallons of medicated syrup besides quite a lot of honey in the combs. I fully expected an outbreak of foulbrood when we examined the apiary the next spring; but there was no sign of anything wrong and so it remains to this day. This would seem to point to the powerful prophylactic action of sulfathiazole on this disease.

Tries New Method

A YEAR AND a half or two years ago Mr. A. S. C. Deans of the East of Scotland College of Agriculture, who manages the beekeeping department at Craibstone, Aberdeen, wrote to me suggesting that I should, if I found any cases of AFB, try a new method of applying sulfathiazole in the form of a dust which is applied by means of a common powder blower.

I have been able to test this in two or three cases and these very quickly became sound so far as could be seen by the naked eye. As the method is much more easy to use and takes little time, it can be used while supers are on the hive and does not require the use of syrup as a medium, I greatly prefer it, since it seems, so far as we have got, equally as if not even more certain in its results.

I use a blower called here "The Acme", made by the Acme Chemical Company, Stanwell, Middlesex. It has the advantage of being usable with one hand, a very great asset in this case.

I use the blower in the following way. If the hive is supered over an excluder, remove the supers temporarily and cover to keep the bees out. Now remove one outside comb from the brood chamber and lean it against the hive, or cover it if you like. (I take it that no one would do this unless honey was coming in.) Then by means of the blower, which has a bellows attached, just blow the powder down between the wall and the outside comb remaining in place, then move the next over and repeat until all combs are well dusted. Bees will be covered by the fine powder, too. When all are done, dust over the comb first removed and

(Continued on page 703)

The packing system

of the Ontario Honey Producers' Co-operative Limited, Toronto, Canada

by TOM SHIELDS. Manager

THE SYSTEMS in operation today, for the packing of honey are many and varied. It must be borne in mind that the system and equipment used for packing honey in Canada is centered around the efficient production of crystallized or solidified honey. The sale of liquid honey in Canada represents only a small portion of the total sale (about 15 per cent).

The system for packing honey, as developed on a commercial basis and used by the Ontario Honey Producers' Co-Operative Limited, may not be considered by all to be the best system available. However, if simplicity of operation, with efficient production, at peak periods is taken into consideration, the system in use by the O.H.P.C. must certainly be considered with the best.

Practically all honey transported to the warehouse in Toronto is by truck, shipments being made in metal containers of 70 pounds net capacity or 650 pounds steel barrels. These are supplied free by the Company for the use of shipping members. These containers are used over and over again, very much the same plan as a creamery sending out cream cans to its patrons. All freight on both empty containers being shipped out and the full containers being returned, is for the account of the shipper.

Many shippers who have fairly large trucks, and are geographically situated, in reasonable proximity to Toronto, draw their own honey. They are then in a position to take return loads of empty containers for future use. Other shippers make the best arrangements they can with Public Carriers for Transport of their honey. We find that in practically all cases, the shipper himself is able to secure the most favorable rate for transportation of his honey.

The Permit System

All Company shipments are under what we call a "Permit System". This is to avoid too many transports arriving at our warehouse in one day. Some days so much honey arrives that the entire warehouse staff is required for the unloading, the result being that very little honey is packed and certainly no repacked honey is shipped out. Permits are issued to a certain volume per day, which will allow the ordinary activities of the Company being carried on. Some shipments do not reach the Company on the day the permit calls for, but these are few and they do not upset the system very much.

A closed 70-pound net steel drum with special food lacquer on inside wall and bottom.—Photo courtesy of Continental Can Company of Canada.

The honey shipment arriving at the warehouse is broken down into tank lots. Each drum or barrel has a distinguishing mark, usually a number on a piece of special sticky tape, which indicates the tank from which it was filled at the producer's extracting plant. These tank numbers on the containers assist greatly in the sorting and grading of the honey and usually can be relied upon with a fair degree of accuracy. The shipment is registered in triplicate, simply stating the receipt of so many

cans of honey. One copy is given to the truck driver or shipper. One copy goes to the Company grader, and a third copy is held in the office. After grading is completed, the grader's copy comes to the office and is matched with the office copy and entered into the Company's books to the credit of that shipper.

Samples of each shipment are kept in case of disputed grades. A grading certificate is mailed to the producer-shipper, giving the information of so many pounds of honey, color, and grade. Should the shipment not be up to standard, the reason why is noted on this grading receipt with a warning on the first occasion to the shipper. Should the shipper fail to take notice of this warning and follows the practice, we'll say, of sending in poorly strained honey on a second occasion, he is then charged a penalty, which usually has the desired effect of immediately correcting the situation.

The Bank Book Method

ONE OF THE greatest difficulties in the operation of a Co-operative packing plant is to have the records and business operations with the producer simple enough, so that he can understand without too much correspondence. Originally, we experienced great difficulty on this point, and finally came up with a simple understandable record.

We assumed that every producer-shipper understood the method of putting money in a bank and the withdrawing of same. Therefore, we designed what we chose to call "A Pass Book or Bank Book Record". The honey shipped to the Company would represent the money going into the bank, and the cheques being sent out as advances when authorized by the Board, represents the withdrawal of money from the bank. It is estimated that after this simple system was put into operation, our correspondence with producers dropped probably 80 per cent. As soon as a shipper is through shipping to the Company for the season, he receives his pass book. The shipper sends in his pass book every time he draws money on authorized advances. This pass book is returned with final pool closing payment, and the shipper has a complete transaction of the year's business.

Batches of honey passing through the plant are prepared by the Company grader. A docket is prepared, noting number of drums of honey with the class and grade. Each batch for

Ontario Honey Producers Co-operative Limited

In Account With

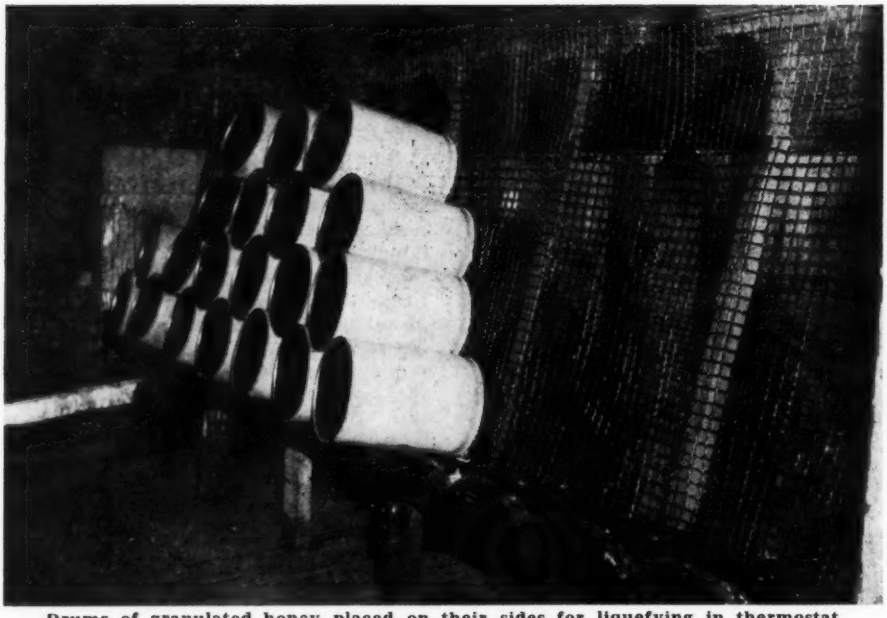
JOHN DOE
INGERSOLL ONT.

This is a record of your account and must be returned to Head Office to be posted to date at time of requesting advance.

No. 1953

DATE	POUNDS	GRADE	FOLIO	AUTH. ADV.	DRAWING	CREDITS	BALANCE
AUG 15	2500	LT #					
	1500	SOL #					
	2500	L.A #					
	1500	SUC #	6120	#			
SEP 10			5513	#	6000 SPL #		
SEP 15			4610	#	3570 TIN #		
OCT 1		LT		2		5000 —	
		SOL —		2		3000 —	
		L.A #		2		5000 —	
		SUC #		2	—	3000 —	6430 #
OCT 15					6430 CHQ		#
NOV 1			4590	#	1575 SPL		
NOV 15		LT #		4	#	10000 —	
		SOL #		2	#	3000 —	
		L.A #		2		5000 —	
		SUC		2		3000 —	19425 #
DEC 10					19425 CHQ		#

A bank book record.

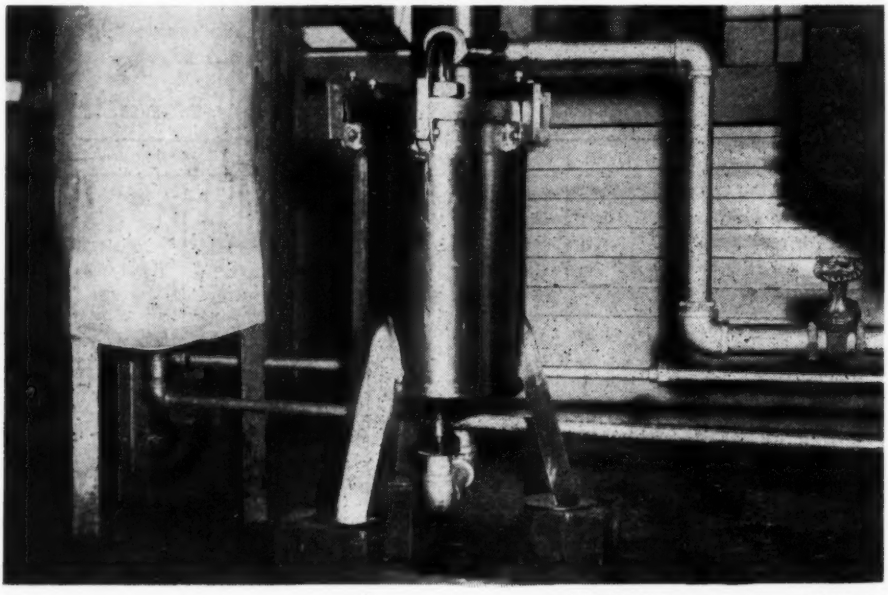


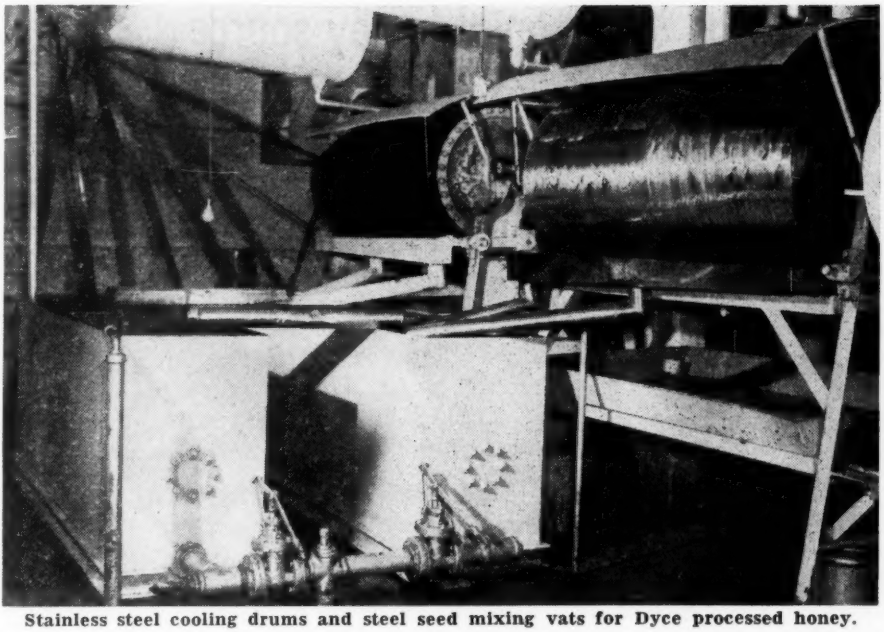
Drums of granulated honey placed on their sides for liquefying in thermostat control (140 F.) oven.

regranulated packing represents approximately 6,000 pounds. The honey is, of course, usually granulated, except in the early part of the production season and the drums or barrels are liquefied in a special oven.

The 70-pound drums are placed in the oven, lying on their side with a slight slope. As the honey melts, it runs away draining into a trough in a semi-liquid or sludge form to a storage vat underneath the oven. This vat will

Below: Special stainless steel strainer. Honey is forced through by air pressure (approximately 20 pounds).





Stainless steel cooling drums and steel seed mixing vats for Dyce processed honey.

hold approximately 14,000 pounds of honey. Once the honey is placed in the oven it is the responsibility of the Plant Superintendent, in charge of the processing packing arrangements. The Plant Superintendent must sign the dockets, indicating that he has received this honey as to quantity and quality.

After the honey is liquefied, it is then pumped to a pre-heat jacketed kettle which holds approximately 6,000 pounds of honey. The honey is kept in constant agitation of a very slow

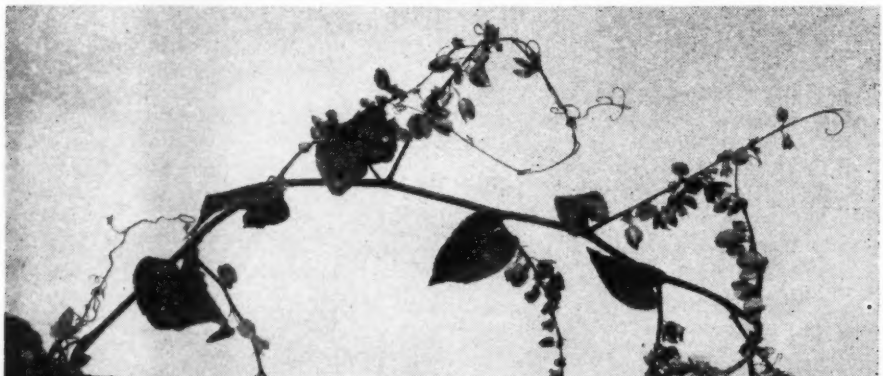
(Continued on page 699)

Section of one control room with a constant temperature of 570 F.

B & Z LIBRARY

Coral vine a perennial honey source

by GONZALO S. ORDETX, Havana, Cuba



Coral vine or "Coralillo rosado" (Antigonon leptopus). In sections where this plant is common there is a perpetual honey flow.

THE CORAL VINE (**Antigonon leptopus**), or "Confederate vine" as it is sometimes called in Florida, is a large climber native of western Mexico and northern Central America. It is a handsome and showy plant, for which reason it is extensively grown as an ornamental in Florida and Texas, and in almost all tropical regions. In Cuba it has become naturalized throughout the entire island, being more common today than many of our native vines.

This plant belongs to the **Polygonaceae** family. According to Standley, the family consists of herbs, shrubs, and trees, sometimes scandent, which are easy to recognize by the alternate entire leaves usually provided with sheathing stipules. The best known representative of this group is the "buckwheat", an important source of surplus honey in the temperate zone. Among other members of the family that deserve mention are the "seagrape" (**Coccoloba Uyifera**), a heavy yielder along the seashores in tropical America, and the "dzidzilche" (**Gymnopodium antigonoides**), the most valuable honey plant in Yucatan, Mexico.

The coral vine climbs by tendrils at the ends of racemes. In Cuba, its pretty rose-colored flowers appear throughout the whole year; the flowering is most intense in spring, and in autumn, when it is invaluable to the beekeeper. We may say that it is **the only vine in the tropics capable of keeping a colony active during all seasons of the year.**

In many parts of Texas, this plant freezes to the ground each winter, but comes out in the spring to bloom profusely throughout the summer and autumn. In Florida it flowers from early spring until late fall.

Picturesque local names have been given to this species in various parts of Central America. Best known among these are "confite" (sugar-plum), "bellisima" (beautiful), and "cadena de amor" (love's chain). In Mexico it is called "San Miguelito"; in Cuba, "coralillo rosado"; and in Texas, "queen's wreath". The Brazilian Portugese name is "amor agarrado" (literally, love seized).

Yields Nectar Freely

THE FLOWERS of the coral vine secrete nectar copiously in the morning. In the afternoon in those plants that are exposed to the burning rays of the sun, the gradual diminishing of the flow is noted. When the days are cloudy, on those vines climbing trees or partially shaded, the flow of nectar continues all day, it not being rare to see bees even at dusk obtaining some nectar from the blossoms.

Frank Stirling, noted apiculturist, maintains that "this vine is more valuable to cultivate only for its honey than any other plant in Florida". Competent Cuban beekeepers hold a similar opinion.

With a reasonable price for honey, the coral vine is perhaps the only species in Cuba that not having any other value apart from the nectar that it produces might be profitable for the beekeeper to cultivate. Its honey production should pay for the expense of planting and for the construction of the vine arbors by the second year of the crop; and it is for many years a perennial source of honey, if the plantation is not destroyed. These experiments have not been verified on a large scale due to the fact that the beekeepers fear that in the future others may be able to profit by his hard and expensive labor. Behold here the need for the State to legislate on the distance that should exist between apiaries.

Propagation of the plant requires some care. The seed can not be scattered in the fields and along the fences because the vine does not prosper and weeds choke it. It must be planted in loose soil and must be watered abundantly during the first months until the plant acquires some vigor, then it extends itself continually and never dies, even if no attention is paid to it.

The value of this climber as a source of honey is clearly demonstrated during the flowering of the "aguinaldo" (**Rivea corymbosa**), the best melliferous species of Cuba, since if there are some plants of coral vine in bloom, bees are seen to work in swarms on its flowers, although the "aguinaldo" may be in its maximum secretion.

We have noticed that the coral vine appears to secrete more freely on cloudy and humid days. In those conditions the air is nearly saturated with moisture and the plant evaporates less water through its leaves, which causes an increase of the pressure outward in the nectar glands.

The honey is of a clear color, almost white, of good taste, and of a characteristic strong aroma. It should occupy a privileged place in world markets.

BEEKEEPING IN SINGAPORE

(Continued from page 650)

abreast with progress by reading up-to-date books and magazines.

Sources of Nectar

The bees in the Lee Apiary gather their nectar and pollen mainly from rambutan and durian fruit trees and also from banana, coconut, and other local fruit trees. Wild flowers are also a source of collection.

The rambutan and durian season starts from April to May and from August to September each year, while the banana, coconuts, and other local fruit trees bear fruits the whole year round.

The Italian bees which I keep in the Lee Apiary, however, do not care very much for coconut flowers, and gather from them only as a last resort when they fail to obtain supplies from elsewhere.

We have three main kinds of bees locally—"Apis Dorsata" (the East Indian giant bee), "Apis Indica" (local bees), and "Apis Floria" (a small type local bee). The "Apis Dorsata" and the "Apis Floria" build only in one single comb, while the "Apis Indica" build theirs with plenty of combs. The "Apis Indica" is the only local bee that can be kept in our modern movable-frame hives, but they produce very little honey.

I am trying my best to get more local people with or without fruit orchards to be interested in beekeeping which can be a very interesting and paying hobby if done the right way.

Sterilization of honey for bee feeding

by JONATHAN W. WHITE, Jr.,
Eastern Regional Research Laboratory[1], Philadelphia 18, Pennsylvania
and A. P. STURTEVANT[2]
Entomology Research Branch Agricultural Research Service
United States Department of Agriculture, Laramie, Wyoming

FROM MANY POINTS of view, honey appears to be an ideal material for the various types of bee feeding. A disadvantage, of course, is the higher cost of honey over sugar, which is widely used. Off-grade, dark, strong-flavored, unmarketable honey would be economically more suited for the purpose. Unfortunately, such use of honey is often not recommended because of the possibility of spreading the serious bee disease, American foulbrood.

Several years ago, at the request of Production and Marketing officials of this Department, we undertook a study of this problem. The objective was the development of a practical method for the sterilization of honey with respect to the organism causing American foulbrood so that the then considerable amounts of low-grade honey in the hands of the Department might be used for bee feeding without possible spread of disease. J. I. Hambleton, of the Section of Bee Culture and Biological Control, urged that sulfa not be relied on for the purpose and also that the treatment be such that the spores of the organism be killed and not simply be rendered nonvirulent.

There was some previous experience to go on. White in 1920 (1) stated that a variation had been observed in the thermal resistance of spores of **Bacillus larvae** obtained from different geographical sources. He found that the most resistant spores studied, when suspended in water, were destroyed by heating at 212° F. for 11 minutes but withstood longer heating when suspended in honey or diluted honey. White found that spores suspended in honey diluted with an equal volume of water could be destroyed by heat at 212° F. but that it might require half an hour or more.

Many beekeepers for a considerable number of years have more or less followed the following instructions (2): "No attempt should be made to recover honey from diseased colonies unless there is a distinct economic saving. Since it is often impossible to ascertain the source of honey purchased on the open market, such honey should not be fed to colonies of bees if it can be avoided. If such honey has to be used, it should first be diluted with an equal volume of water and boiled for an hour in a closed vessel."

Burnside recommended in 1945 (3) that "boiling for 30 minutes can be depended upon to destroy the virulence of spores of **Bacillus larvae** under any ordinary conditions." This was based on a thermal resistance study of spores of **B. larvae** in water, diluted honey and beeswax. Sixty-two colonies of bees received honey containing spores that had been boiled for various times from five minutes to five hours. None showed any signs of disease during the season. All spores that had been boiled in honey showed vegetative growth in the laboratory; all, however, also showed a delayed germination time. Burnside (3) interpreted the loss of virulence as brought about by the increase in germination time of the heated spores beyond the 2¼ day period in which larvae are susceptible to the disease, according to Woodrow (4).

With these requirements in mind, we have worked out a process by which honey can be sterilized with respect to AFB spores. In this work we used honey infected with **B. larvae** spores at a level recommended by other workers in the field, about 150 million per ml.

Approaching the Problem

OUR FIRST APPROACH to the problem was to try to find some chemical agent or material that we could add to the honey that would kill the spores, either alone or in combination with some heating. After many trials, we found several substances that looked promising at a level of 0.1%[3], combined with heating. Sam-

[1] A laboratory of the Eastern Utilization Research Branch, Agricultural Research Service, U.S. Department of Agriculture.

[2] In cooperation with the University of Wyoming.

[3] These are listed on page 13 of reference 5

ples were made up and tested by feeding to honey bees. The chemicals were fair sporicides, but they also killed the bees.

After this experience, we did some fundamental research on the AFB spores. We decided to rely on heat alone and carried out what is called a thermal-death-time study on the organism. This means that we determined in the laboratory just how high a temperature was necessary and how long it had to be applied to kill the spores. This is the sort of study that our commercial fruit and vegetable canners use in determining the heat processing of canned foods.

After the time-temperature relation had been determined for **B. larvae** spores, it was possible to obtain from the data the time of heating needed to kill the spores at any temperature. A description of the determination of the thermal-death-time curve has been published elsewhere (5). Thus we had the type of information on which a process could be based.

We then developed a process, and our Engineering Section modified existing equipment so that it could be used for a continuous sterilization process for honey. Using a high-temperature short-time approach, we could kill the spores by heating the diluted honey[4] to 284° F. in two seconds, holding it at that temperature for 50 seconds, and then immediately cooling it to the boiling point of about 220°. In the small pilot-plant equipment, we could treat the diluted honey at a rate of 20 gallons per hour. Incidentally, this treatment had virtually no damaging effect on the honey (5). Honey treated in this manner, as well as similar untreated honey, was non-toxic when fed to bees in cages.

There is a catch to this process. In order to make it economically reasonable, the equipment has to be designed to treat several million pounds of honey per year. Of course, there isn't that amount of such honey at one place, and it isn't practical to ship honey for the purpose. It isn't the sort of thing a beekeeper could set up in the honey house.

Our final approach to the problem was to use the other end of our time-temperature curve. Instead of high temperature-short time, we used lower temperature-longer time. In order to eliminate costly equipment, we used the boiling point of honey when diluted to about 55% solids. From the thermal-death-time curve, for the temperature of 220° F., which is the boiling point at our altitude (about 500 feet above sea level) we found that the time required for sterilization, including a safety factor, is 90 minutes. This time would be increased with lower boiling points at higher elevations, as shown at the end of this article.

Some of our darker, off-grade honeys throw down a precipitate when they are boiled. This can be avoided if a small amount of phosphoric acid (an edible food acid) is added.

We prepared a quantity of honey carrying about 150 billion spores per liter, diluted it to 55% solids, acidified it with one fluid ounce of phosphoric acid (diluted 1 to 5 with water) per gallon of honey and boiled it for 90 minutes. The temperature increased from 218° to 227° F. during this time. Laboratory culture tests showed that there was no growth of **B. larvae** over a 30-day incubation period. Then it was submitted to the Bee Culture and Biological Control Laboratory at Laramie, Wyoming, along with some unheated infected control honey for feeding tests.

Colony Feeding Tests

THE FIRST colony feeding tests were started the latter part of May and early June 1952. Three healthy overwintered colonies of uniform strength were chosen. A careful inspection at that time showed no active disease or old disease scales. Two of the colonies were fed approximately two quarts each of the treated honey on two days a week apart, a total of four quarts. The third colony, used as a check, was fed two quarts of the spore-containing honey that had received no heat treatment.

The check colony had developed considerable AFB by the 19th day after being fed the untreated honey, and near the end of June was heavily diseased. Disease developed in both test colonies fed the treated honey. Six diseased cells appeared in one

[4] Honey was diluted to 55% solids; two parts by weight of honey to one part of water.

colony by the 19th day after being fed the treated honey. In the other colony disease developed much more slowly; only two AFB cells had appeared by the forty-fifth day after the first feeding.

Throughout July, disease spread very slowly in both colonies, only from two to five cells of AFB were seen at any one inspection. After the first of August until near the end of brood rearing in September, however, both colonies became relatively heavily infected. Since these colonies all were headed by queens of the same relatively susceptible stock, the eventual spread of disease in each colony, after the development of the slight amount of initial infection, was to be expected.

There are some explanations for the way disease developed in the two test colonies fed the treated honey. It is possible, although not probable, that a sufficient number of spores to produce the slight initial infections may have escaped the lethal conditions, either by adhering to the sides of the vessel above the liquid surface or in foam produced by the boiling, thereby remaining both viable and virulent. However, the sides of the vessel had been washed down several times.

Since the laboratory culture tests showed no growth of **B. larvae** even after 30-days' incubation, there is the more probable possibility that those test colonies may have picked up infection from some previous or outside source other than from the heated honey fed to them. The test colonies, although apparently healthy at the time they were fed the heated honey, may have carried over a small hidden focus of infection from **B. larvae** inoculations in connection with the American foulbrood resistance studies in previous years. An occasional case of disease the second season after inoculation has at times been observed in colonies with a similar history. Furthermore these colonies were located in an apiary in which some other AFB experimentally diseased colonies were present. The test colonies could have picked up infection either from drifting nurse bees or through robbing.

Since the test colonies were headed by AFB susceptible stock queens, a slight amount of infection in the colony or introduced from the outside might eventually produce active infection in a few larvae, from which the disease could spread through the colonies, as apparently appeared to be the case.

The treated honey tests made in 1952 were considered unreliable, since they were not sufficiently controlled to prevent the possibility of disease from sources other than the treated honey. Therefore, a second lot of AFB honey was prepared early in 1953 and sent to Laramie for further colony testing; the heating procedure and the **B. larvae** spore content were the same as used in 1952. In 1953, however, extra precautions were taken to prevent any contact of the bees with any source of infection other than what might be present in the treated honey fed to the colonies. The laboratory culture tests[5] were negative for growth of **B. larvae.**

SEVEN COLONIES were established for this purpose about the middle of May 1953 with two-pound packages of bees and sister queens, shipped from Louisiana. They were fed at the start only sugar syrup (one to one by volume of sugar and water), and each was given one pollen cake (pollen from a known non-infected source, mixed with soybean flour). After the colonies had developed to sufficient strength, six were moved to a completely isolated location some 15 miles from any disease-experiment apiaries or any other known source of AFB infection. The seventh colony was held at the original apiary location.

The six isolated test colonies were each fed two quarts of the 1953 heat-treated honey on July 1, and the seventh colony, used as a check, was fed two quarts of unheated honey on the same date. Some disease appeared in the check colony by July 10 and by July 21, three weeks after being fed the untreated honey, it was heavily diseased with American foulbrood. Inspections of the colonies fed the heat-treated honey were made about every 10 days throughout the 1953 season until the end of brood rearing. No disease was observed in any of these test colonies. All colonies con-

[5] Procedures for these tests are given in reference 5.

sumed the heated honey about as readily as sugar syrup, and no visible evidence of harmful effects to the brood or to the adult bees could be observed. All but one of the test colonies came through the winter of 1953 to 1954 in good condition. One colony died during the late winter from starvation. None of the remaining colonies showed any evidence of AFB when inspected on April 18 and again on June 3, 1954.

Therefore, results of one entire active season and observations well into the second season indicate that honey which may be contaminated with spores of **B. larvae** or honey from unknown sources, can be made safe for feeding to healthy colonies by the heat treatment described above. Colonies fed such treated honey should be kept under careful observation for more than one year. Such boiled honey should not be fed in winter because of the possible danger of its causing dysentery. Feeding such honey should be carried out only after bees can have unimpeded flights in the spring.

Process for Treating A.F.B. Honey

We can therefore outline the following process by which honey can be treated to permit feeding to bees without fear of spreading American foulbrood.

Diluted phosphoric acid (17%): To make, mix one part concentrated (85%) orthophosphoric acid with four parts of water.

Mix one 60-pound can of honey with 30 pounds of water (about 3½ gal.), add five fluid ounces of diluted phosphoric acid and heat to boiling. Note the temperature at which active boiling begins and continue boiling for the time given below.

215° F.	2¼ hours
220° F.	1½ hours
225° F.	1 hour

If much foam is formed, it should be skimmed off and disposed of, since spores could possibly survive the heating if they remain in a surface foam.

Acknowledgements

We are indebted to Eleanor J. Calesnick and Joseph Naghski for bacteriological work and to A. S. Michael, Floyd Moeller and J. D. Hitchcock for toxicity testing, and also to J. D. Hitchcock and I. L. Revell for assistance in colony manipulations and disease inspection.

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It's an Idea

Fast and Easy Repair to Metal Covers

by MILTON STRICKER, Annandale, N. J.

HOLES in metal covers can be repaired easily and lastingly with the new low melting point solder now on the market. This is simply melted with a match into the hole on the metal cover. Smoothed off with sand paper and painted, it will last as long as going to all the trouble with the old method of tinning and mending with the bother of heating your soldering iron and getting out your acid and flux.

The struggle of bees

by DR. E. E. LEPPIK, Sioux Falls, S. Dak.
Professor of Biology, Augustana College

After only half an hour furious attacks and actions are already in course. A large number of bees have gathered in highest excitement at the entrance and on the starting platform of the hive. In the foreground several still sound bees have surrounded the poisoned and marked bees and are just about to kill them.

ON A SUNNY day numerous beekeepers around a small town in Bavaria noticed their bees being in a **desperate mass struggle.** It was a very strange spectacle to see the furious bees attacking and killing each other in great numbers. The air around the hives was crowded with excited bees and everyone who dared to step too close was attacked and stung. Soon the ground around the hives was covered with a thick layer of dead bees. Six million bees were killed during a day and twelve beekeepers lost their honey harvest and income of the whole season.

The disappointment of the beekeepers grew, when the irritating agent which caused the struggle of bees was found to be in some new insecticides. The losses in bees raised correspondingly with the increased application of these insecticides by farmers. Soon the Agricultural Department of Westfalen in Western Germany registered a loss of 20,000 bee colonies, killed by insecticides in one season.

Bees are not only necessary for the production of honey but are even more important for the pollination of fruit trees, seed plants, and for the restoration of soil fertility. A loss of 20,000 colonies during a season of pollination means a considerable drawback in fruit and seed production and a proportional loss in fertility of soils.

Experiments with Nerve Poisons and Bees

These serious accidents led the writer of this article to an extensive study about the influence of the newly discovered nerve poisons upon bees.

Already after a year of experimentation in the State Horticultural College of Bavaria with my capable coworkers, assistant I. Kraml and inspector O. Palm, the turmoil of the bees could be explained and demonstrated in an experimental apiary. The strange phenomenon was called "the struggle of bees", which name was also accepted by beekeepers. Later the struggle of bees was studied and confirmed also by Karl von Frisch, the well-known discoverer of bees' dances, and his co-workers.

This discovery and the further study

of nerve poisons rendered a valuable service to apiculture. It prevented further accidents and mass killing of bees. Five years later, in the summer of 1953, inspector O. Palm could report that there were no mass killings of bees any more in Germany. The serious warnings, the educational activity how to use the new insecticides properly, regulating and protective laws for apiculture, and all other precautions helped to reduce the accidents.

TEN BEES were marked with a white spot on their backs and brought into contact with nerve poison. When they returned to their hives, other bees did not call any attention to them. The sentries at the entrance did not suspect anything wrong with them and let them pass through.

In half an hour the poison took effect, however, and soon the "struggle of bees" began. The poisoned bees started to tremble (trembling dance, "Zittertanz") and stagger (staggering dance). These staggering movements (alarm dances) were highly alarming to the other bees and caused a great excitement in the hive.

The healthy bees attacked the poisoned ones and tried to kill them or to drive them out of the hive. But before all the poisoned bees could be liquidated a new danger arose. During the fightings the poison began to distribute from one bee to another. More and more bees got intoxicated and the fury and range of bees increased constantly. Once even a queen bee was killed.

There is something very tragic in the struggle. The healthy bees are infected in their turn, whereupon they are attacked. So we have a kind of chain reaction, with death as the end. In fact, only a few poisoned bees were able to provoke the terrific battle, which cost thousands of lives and made the whole colony so weak that it could not survive. After every struggle the area surrounding the battlefield was covered thickly with dead bees.

Why the Bees Fight

SUCH A STRUGGLE described above cannot be regarded as a fight between individuals as a human being would look at it, for not the least attention is paid to the death of individuals in the hive. These struggles are in full keeping with the instincts of the bees as a desperate fight for the **existence of their species.** This is also observed when epidemic diseases are spreading in a beehive, even if not to the same extent nor of a comparable violence as is seen in the "struggle".

Some Conclusions

Some new discoveries in biology, chemistry, and in the field of bee behavior open to beekeepers many new opportunities but also some new dangers. The introduction and mass application of new insecticides on the basis of nerve poisons present a new danger for bees and beekeepers. The beekeepers have necessarily to know the struggle of bees already before they have to sweep together their dead bees around their hives.

The proper use of insecticidal materials is emphasized in order to protect valuable insects, such as bees, certain predators, and soil insects. New organic toxicants, when applied wisely, are not necessarily killing for bees. Timing the application to avoid contact with bees also is important.

"Sparkleberry"

Sparkleberry or high bush huckleberry. The berries are dry and seedy, but are liked by children, and the flowers are honey producers. Known to plant specialists as the "Sparkleberry". —Photo by Paul Hadley.

A scene from the vast assembly of delegates at the Freemason's Hall in Copenhagen. Under the glistening splendor of the beautiful chandeliers and candlelabra over 500 sat down to the most elaborate evening of this XVth International Congress.

XVth international beekeeping congress at Copenhagen

by CECIL B. TONSLEY, Editor, British Bee Journal

IF SOMEONE were to ask, "What strikes you most about Denmark, and particularly Copenhagen?" the answer would probably be that this is the only place in the world where it is possible to get a quart into a pint pot.

One wonders how such a large population is able to live in such a small area as that encompassed by Copenhagen itself.

In attendance at the International Congress, France headed the list in number with Great Britain a close second. There were a good number from Algiers, Switzerland, and Germany, too, while representatives from Belgium, Finland, Italy, Japan, Yugoslavia, Canada, New Zealand, Norway, Spain, Sweden, America, Egypt, and Austria, together with the Danish beekeepers themselves completed the list of more than 500, all with a common ideal—the love of bees.

The Exhibition of Danish and Norwegian beekeeping, to which most of the delegates flocked is set in the beautiful grounds of Frederiksberg Have. Here we saw much to occupy our thoughts from the well-known Muller apparatus for providing queens on a large scale, to very old Scandinavian beekeeping appliances which now compose the museum pieces of the craft of this part of the world.

Among these we were very intrigued with the first honey extractor, looking for all the world like a sturdy clothes-horse, supporting a center wooden rod to which were attached two wooden boxes which immediately levitated as soon as the great handle on the side was turned. Then the quaint, brightly patterned beehives with straw walls or painted wood, with steep, sloping wooden tiled roofs; or the beautifully shaped straw skeps which were so popular in these parts before the modern trend to movable-frame hives.

IT WAS HERE that many an old acquaintance was renewed and new ones made. **Mr. J. I. Hambleton** found many of his old friends, and **Mr. Sanders** in his ten-gallon sexton and footwear to match, looked more like a rancher than a beekeeper. In fact, it was he who caused such a stir among the Danish children at Kastrup airport when he was mistaken for Hoppalong Cassidy.

The Congress was opened on Tuesday, August 31st by the Minister of

Agriculture, **Mr. Jens Smorum.** He welcomed all the delegates from the different countries, reminding them that beekeeping in Denmark was a very old craft, originally started to provide a supplementary livelihood for the farmers but later being encouraged in the schools and particularly among teachers.

Mr. Smorum was followed by **Dr. R. H. Barnes,** past President of the Congress, who said it was his duty to introduce the new President Mr. B. Schwartz-Hansen. He referred to him as a small man with a great ideal, and enormous organizing ability in performing the task of bringing about this fine Congress.

Mr. Schwartz-Hansen in his response thanked Dr. Barnes and the British beekeepers, adding that he welcomed on behalf of the Danish beekeepers all beekeepers from other lands, and his country felt very honored that it should have been chosen to be the meeting place for such an important gathering. At times, he felt that the magnitude of the task had been almost overwhelming and he apologized in advance for any slight discomfort which the delegates might experience. In conclusion he expressed hope that the Congress would be a success, benefitting not only international relations but the bees, beekeeping, and the beekeepers.

This was a signal for **Mr. Ole Hammer,** Head of the Danish Bee Department, to open the first of the lectures with "An Introduction to Danish Beekeeping", illustrated throughout by a series of beautiful color slides linking Danish agriculture and its beekeeping; showing the close relationship and importance which the honey bee played in this field.

Dr. Colin Butler from Britain followed the previous speaker to lecture to the full assembly on "The Importance of Queen Substance in the Organization of the Social Life of Honeybees".

At the close of this lecture a short break allowed the officials to rearrange this great hall as two separate lecture rooms through the expedient of a concealed oak-panelled wall which later was fitted with beautifully wrought candlelabra similar to those on each of the other three walls.

The great party was divided into three groups, each taking a slightly different route in order to prevent congestion at any one point during the day, and so the coaches moved off all with their final objective—Strodam, the Danish Beekeeping Research Station.

One party made for Tune near Roskilde to Neilson's, the principal Danish bee appliance firm, and what a sight it must have been for the "locals" to see three coach loads of beekeepers of many nationalities, spewed out into this village.

Here old combs were having their wax extracted by centrifugal methods and this was then being run off into pails to harden as blocks before being rendered once more for foundation.

Well, from the steam-laden atmosphere of a wax plant we took the road to Roskilde and Roskilde Cathedral where lie the remains of the Danish kings and queens.

After visiting the Cathedral we proceeded to the most interesting and focal point of the day, the Bee Research Station at Strodam, Hillerod. The few hours at the visitors' disposal were insufficient for all the interest which was available.

Thursday was one of the usual days, lectures in the morning and afternoon. In the morning there should have been three British speakers, Dr. H. Malcolm Fraser, Mrs. R. M. Duruz, and Mr. J. H. Armitt. Owing to unforseen circumstances the last two could not attend and their papers were taken by other British delegeates. Dr. Fraser, however, delighted his audience with the "History of Beekeeping in the British Isles Prior to 1066".

Disease being uppermost in the minds of many of the delegates it was not surprising to see a good audience attend the session on acarine and nosema, in which the shining lights were G. D. Morison, H. Gontarski, and L. Bailey.

The climax of the Congress was undoubtedly reached at the dinner on Friday evening. What an excellent affair it was, with more than 500 people gathered from all parts of the world under the glistening chandeliers of this grand Freemans' Hall, which had but a few hours previously been used for the final lectures. The transformation seemed unbelievable.

Know your honey

by CHARLES W. GOUGET, Glen Ellyn, Illinois

THE AMERICAN Consumer is a "fussy" customer. He demands a quality product with an attractive appearance: neat, convenient, and sanitary. Since he has been well educated to standard grades of quality and packaging among foods he is a selective, intelligent buyer with some knowledge of food values and vitamins. He likes to know what a food contains and how it has been prepared. He is hard to please, but he will pay almost any reasonable price for a quality product that will suit his fancy.

In a like manner it takes a "fussy" producer to satisfy a "fussy" customer because only a "fussy" producer can maintain a standard, quality product. To put out a quality product the producer should be familiar with the accepted standards of quality for his product laid down by the United States Department of Agriculture, and he should know how to reach these standards through organization and techniques that will allow him a reasonable profit. The final sale to the consumer involves a great deal more "know how" than meets the eye, but "know how" means nothing more than knowing as much as one can learn about the product to be produced.

Composition of Honey

To most consumers honey is only another sweet to be classified with jams, jellies, and sugar. Few people are aware of the health values of honey as a natural food, nor are they familiar with the benefits often derived from its use in connection with many human ailments such as asthma, hay fever, and arthritis. This all means that the real merit of honey lies in its composition, a fact which should be emphasized on the label of every jar of honey sold to the public.

With information on the label the storekeeper too will soon learn that: "Honey is like a doctor's prescription" because it contains not only one sugar, but two sugars: levulose and dextrose, both of which require no digestion in the human body.

These simple sugars are absorbed directly without change and supply more carbohydrate food than an equal volume of sugar. The ratio is about 9:7 and although honey is not rich in vitamins it does contain enough of the vitamin B complex for the assimilation of carbohydrate.

Darker honeys are usually much richer in minerals so essential to good nutrition in animals. Although some are present only as trace elements, the most important are: iron, sodium, potassium, manganese, and phosphorus. Most of these elements are essential constituents in the human blood.

U. S. Standards and the Color of Honey

ACCORDING to United States Standards there are three types of honey sold on the American Market:

a. **Extracted honey** is defined as liquid honey separated from the comb by centrifugal force, gravity, straining, or other means. Crystallized honey is also classed as extracted honey.
b. **Comb honey** is honey contained in the cells of comb.
c. **Chunk honey** is comb honey surrounded by extracted honey.

Since grades of extracted honey are based on color, and since the public buys its honey largely by color, color has long been an important factor in marketing the honey crop. Color is often a criterion of flavor, because light colors usually have a more delicate flavor than darker colors which may be much "stronger".

Honey colors vary from water white to dark brown or almost black in some forms. For example, sweet clover honey is greenish yellow in appearance while buckwheat honey may be dark brown or almost black. Buckwheat, too, is much stronger and much less desired by most people than sweet clover honey and its market is limited to a special trade.

Color is affected also by the age of honey, the length of time that it is heated during pasteurization, and the temperature used. Over a period of time organic particles in honey, such as pollen, disintegrate discoloring the natural color much on the same order

Color classifiers for extracted honey (front view), showing the blanks and cloudy suspensions in place behind the mounted color standards, and two samples of extracted honey to be classified.—U.S.D.A. photo by M. C. Audsley, page 596 October issue.

as particles of dead plants discolor the water in an aquarium. The same thing happens in overheating, but at a much more rapid rate. All of these factors affect the quality and of course the selling price of the honey.

Color Standards for Extracted Honey

The first reasonably accurate color standards for extracted honey were obtained by the use of the Pfund Wedge Comparator. The instrument contains a wedge of amber glass, a wedge-shaped cell for holding a honey sample, and a millimeter scale with a pointer to indicate where a color match is obtained. The boundaries of the color ranges corresponding to the common color standards are as follows:

Water White	1 - 8 mm.
Extra White	8 - 17 mm.
White	17 - 34 mm.
Extra Light Amber	35 - 50 mm.
Light Amber	50 - 85 mm.
Amber	85 - 114 mm.
Dark	114 mm. or over

U.S.D.A. Pub.

Since the Pfund instrument is practical only for laboratory use the U.S.D.A. has devised a system of permanent glass color standards for use in classifying extracted honey. The permanent glass color standards are made a part of the revised United States Standards for Grades of Extracted Honey which became effective April 16, 1951. The new Color Classifier now replaces the Pfund Wedge Comparator as a method of color classification.

U. S. Grades of Extracted Honey

GRADE A (1) U. S. Fancy Extracted Honey may be honey of any color, but it shall be clean, and free from damage caused by turbidity, overheating, fermentation, honey dew, objectionable flavor, or other means. The honey shall be well ripened and shall weigh not less than 11 pounds 12 ounces per gallon of 231 cubic inches at 20 degrees C. or 68 degrees F.

Honey of the crystallized type of this grade shall be uniformly granulated, smooth and fine in texture, and when liquefied at 130 degrees F. shall meet all other requirements of U. S. Grade A or U. S. Fancy.

Grade B (2) may be honey of any color, fairly clean and free from damage caused by turbidity, overheating, fermentation, honeydew, objectionable flavor or odor, or other means.

The honey shall be well ripened and shall weigh not less than 11 pounds 12 ounces per gallon of 231 cubic inches at 68 degrees F.

Honey of the crystallized type of this grade shall be uniformly granulated, fairly smooth and medium to fine in texture, and when liquefied at 130° F. shall meet all other requirements of U. S. Grade B or (2).

Off Grade extracted honey fails to meet the requirements of U. S. Grade B.

Grades of Comb-Section Honey

I. Standards for U. S. Fancy.

a. No uncapped cells except in the row attached to the section.
b. Comb must be attached to about 75 per cent of the area.
c. Comb must not project beyond the section.
d. There should be no more than two and one-half linear inches of through holes and no dry holes.
e. There should be no cells containing pollen.

Cappings should be white, clean and dry, uniform, and free from damage due to granulation, objectionable flavor, odor or other means. The minimum weight of the comb section should be 12 ounces.

II. Standards for U. S. No. 1.

a. Comb shall contain not more

(Continued on page 702)

History of the use of smoke for handling bees

by ROGER A. MORSE, Ithaca, New York

Part II

The Modern Smoker

"IF THE APIARIAN only succeeds in frightening his little subjects, he can make them as peaceable as though they were incapable of stinging. By the use of a little smoke from decayed wood, the largest and most fiery colony may at once be brought into complete subjection."

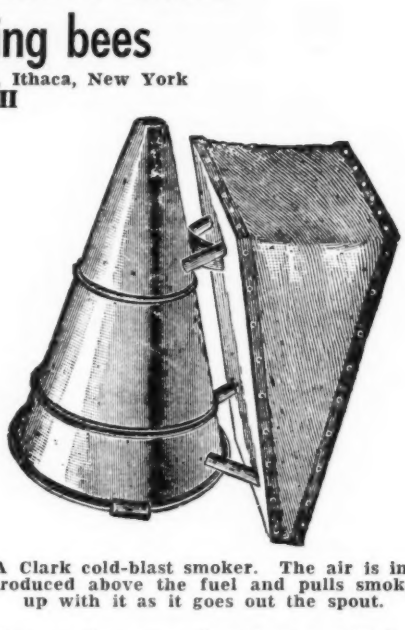
When Langstroth wrote the above in his "Hive and Honeybee" in 1865, the method of smoking the bees was to blow on a piece of burning punk wood and direct the smoke on the bees. This method was undoubtedly effective for a weak colony or gentle strain of bees, but with a strong cross colony many a beekeeper must have suffered. With all the modern gadgets we have to help us in the beeyard today many of us tend to forget that the smoker was invented only about 80 years ago.

L. C. Root who revised "Quinby's New Beekeeping" (1885), states that Moses Quinby was the first to give attention to the construction of a practical smoker. Quinby developed a smoker in 1873 but he did not offer it to the public until 1874. It was the first smoker with a bellows which continued to burn when held in an upright position. Unfortunately when the smoke was directed at the bees the fire pot was held almost upside down and sparks were blown on them.

Smoker Collection at Cornell

Cornell University is fortunate in having an extensive collection of early smokers including some of the original ones developed by Quinby. Most of these have been donated to the University by beekeepers from New York State. They are now kept in a dustproof cabinet where visitors may follow the evolution of the smoker.

The evolution of smokers from 1873 on is very interesting and demonstrates that prior to the turn of the century the beekeeper's problems were no small ones though his financial reward may have been greater. Smokers sold for a price of 50c to $2.00. It is reported that at the same time honey sold for 10c a pound and beefsteak could be bought for the same price.



A Clark cold-blast smoker. The air is introduced above the fuel and pulls smoke up with it as it goes out the spout.

A. I. Root in his 1877 catalog of "Implements for Bee Culture" presented "the Simplicity Smoker" and labeled it as "the smoker which I prefer." At the time he made mention of no other smoker.

By 1879 the thought became prevalent that the air should be forced through the top of the smoker and not be directed through the bed of fire. It was believed that hot smoke made the bees cross but if a blast of cool smoke could be directed over them the results would be more satisfactory. To this end the draft was placed on the top of the smoker. Root's smoker of 1879 was "The Cold Blast Simplicity Smoker". He said about this smoker the following: "A door has been cut in the side, to be opened with a wooden handle, and a short tube on the cone and the Cold Blast invented by John G. Corey, of Santa Paula, Cal., have been added."

From the same catalog we read, "A smoker with the bellows placed upright beside the fuel receptacle, which we name after the inventor, Clark's Cold

Blast Smoker, is now in the works, and will be furnished at the same price as the Simplicities." ($1.00). In a later catalog (1889) Root says that Corey and Clark independently discovered and developed the principle of the cold blast smoker, in Root's words "each inventor being ignorant of what the other was doing".

Double Blast Smoker

QUINBY THOUGHT that the cold blast smoker was good in principle but found that it went out too easily. For this reason he developed a "double blast smoker". The smoker had one draft above and one below the fire.

The lower draft through the fire was used to start the smoker and when the fuel was burning well the lower draft was shut off and the draft was directed above the fire. The upper draft forced only the cool smoke on the bees and also prevented hot sparks from escaping.

The 1879 ABC and XYZ of Bee Culture described a pot which would hang on the side of the hive so that the operator would have both hands free to operate. The pot was fired with sawdust and shavings and it was hung on the side of the hive from which the wind was blowing and thus was supposed to keep a steady stream of smoke flowing over the bees. This device probably was to satisfy those few who complained in the bee journals that the bellows smoker was of little value since it left only one hand free to work the bees.

In 1881 The A. I. Root Company offered the two smokers listed above and also the Bingham and Quinby smokers. The Bingham smokers were offered in four sizes, Extra Large Smoker, Extra Standard, Plain Standard, and Little Wonder.

By November of 1881, A. I. Root stated that the Clark's Cold Blast smoker was outselling the Simplicity and that it was the most popular. In 1882 over 3,000 Clark smokers were sold and in 1883 over 10,000 by the Root Company. By 1885 the production of the Simplicity smoker had been stopped and only the Clark smoker was offered for sale.

Up to 1888 The A. I. Root Company sold but did not feature the Bingham smoker. This was a hot blast type with the air being forced up through the fire. By this time the Bingham smoker was becoming quite popular and the following six sizes were offered: Doctor, Conqueror, Large, Extra, Plain, and Little Wonder. An improvement was a shield between the bellows and the furnace but the shield did not extend all the way around the smoker.

In 1892 there was no popular change and A. I. Root reported that sales of the Clark Cold Blast smoker exceeded all others combined. At that time it was described as being "a breech-loader, and therefore is easily replenished by simply revolving the sliding door—no hot cone to replace and no burning of fingers."

A smoker which looks more like the one we use today was developed by Mr. J. E. Crane of Middlebury, Vt., in 1894. This was a large smoker with a sufficiently large bellows and a shield around the barrel. A. I. Root described it as the smoker for those who want the "best, even if more expensive." By 1895 this smoker was listed first in the Root catalog. A patent had been issued to Crane for the valve which prevented smoke from entering into the bellows. Corrugated metal surrounded the barrel or fire box and gave good protection. A hinged top permitted easy filling of this smoker.

A new smoker, the Corneil appeared in 1896. It was much the same as the Crane smoker but was not as complicated and was cheaper. It, too, was a hot blast type and employed a valve in the bellows. By the next year the Corneil smoker appeared to be more popular than the Crane type. This smoker had a supplementary tube to increase the volume of air pushed through the fire-box and because it probably gave more smoke it was preferred. It was stated that the Corneil smoker was not as strong as the Crane type and it was cheaper.

About the turn of the century the famous beekeeper, Danzenbaker, invented a smoker which had a vertical instead of a horizontal grate. This smoker in keeping with the times was both hot and cold blast. It did not, however, give as much smoke as the hot blast type and it was not too popular.

In their catalog for 1906 the G. B. Lewis Company, however, stated they

were still having some calls for the Danzenbaker smoker with the vertical gate. The advertisement for this smoker showed a cloud of smoke coming from the nozzle with the words, "D. 20th century."

Smoker Develops into a Useful Implement

BY THE TURN of the century the smoker had in a period of 30 years developed from a crude instrument to a useful implement. A few changes were made, such as the elimination of a valve in the bellows which appeared to give continual trouble. An antispark tube which prevented sparks from the fire-box getting back into the bellows had been added. In 1903 the G. B. Lewis Company offered the Corneil smoker which was called a "muzzle loader" because it loaded from the top. In the same catalog is offered, "The Breech Loading Vesuvius Smoker". This smoker had a removable plug on the bottom and was loaded from this end. The top had the usual cone.

Some reflections concerning the evolution of smokers is given in the 1908 edition of ABC and XYZ. The Bingham smoker had established itself as being the most reliable and was featured in many supply catalogs. A snout nozzle was used and preferred and a wire coil handle and hinge had been added to the top of the firebox to facilitate handling. It was some doubt at the time that the cold blast smoker which had been so popular had been worth the trouble, since the hot blast type produced more smoke with greater ease. Better metal was used and in 1915 the Root Company was using a non-rusting German silver and copper metal. A hook was added to the bellows so that the smoker could be hung on the hive. Bingham and Clark cold blast smokers were offered on special order up until the first world war.

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Honey breads

by MRS. BENJ. NIELSEN
Aurora, Nebraska

NEXT TO fruits I know of nothing that honey works out better with than in making our daily breads, both quick and yeast varieties. Delightful flavor, deep golden crust, moist, and fresh tasting, its keeping qualities are superlative. And, honey breads are excellent for toasting, though it does take a bit longer in the toasting process than ordinary breads. Honey-way bread stays moist, toasts golden brown outside, without drying inside.

The three-way treat from mixing of honey-way dough. —Photo courtesy Kellogg Co.

This month's offerings provide a three-way hit for the busy homemaker. From one mixing you may indulge in a three-way baking spree, or bake one or two of these treats, storing the remaining dough in the refrigerator to be baked when needed.

Basic Honey Dough

Two cakes compressed or two packages dry granular yeast, ½ cup lukewarm water, ¾ cup shortening, ⅔ cup honey, 2 cups ready-to-eat bran, 2 teaspoons salt, 1⅓ cups boiling water, 2 eggs, well beaten, and 6½ cups sifted flour.

Soften yeast in lukewarm water. Measure shortening, honey, bran and salt into large mixing bowl; add boiling water, stirring until shortening is melted. Let stand until lukewarm. Stir in eggs and yeast. Add one-half the flour and beat until smooth; add remaining flour, beat well. Place in greased bowl, brush with melted shortening. Cover and let stand in warm place until double in bulk; punch down. Dough may be shaped, allowed to rise and baked at once according to directions below, or stored in refrigerator and baked when needed.

Caramel Muffins

In each of 12 greased muffin cups, place 1 teaspoon melted butter, and 2 teaspoons honey. Using one-third of dough, form into balls and place in muffin cups. Brush with melted shortening; let rise until double in bulk. Bake in hot oven, 425° F., about 15 minutes. Turn upside down and sprinkle with ½ cup broken nutmeats.

Tea Ring

Roll one-third of dough about 18 inches long, 5½ inches wide and ½ inch thick. Brush with melted butter and spread with honey-orange filling. (One cup chopped nutmeats, 2 tablespoons butter, ½ cup honey, 1 tablespoon grated orange peel, 1 tablespoon orange juice, 1 egg, slightly beaten, combined and cooked until thickened stirring constantly; cool). Roll up like jelly roll and seal edges firmly. Place roll on greased baking sheet, pressing two ends together to form circle. With scissors, cut from outside edge toward center, at 1-inch intervals; turn each section slightly so cut edge is up. Let rise until double in bulk. Bake in moderate oven, 375° F., 25-30 minutes. While still warm, brush with confectioners' sugar icing.

Fruit Loaf

To remaining dough, add 1 cup chopped, dried fruits or nutmeats. Form into loaf; place in 9½x4¼-inch loaf pan and brush with melted butter. Let rise until double in bulk. Bake in moderate oven, 375° F., about 45 minutes.

Honey Whole-Wheat Bread

One cake or package of yeast, 1¼ cups luke warm water, 1 cup milk, 3 tablespoons shortening, ¼ cup honey, 1½ teaspoons salt, 4 cups sifted flour and 4 cups whole-wheat flour.

Soften yeast in lukewarm water. Scald milk and add shortening, honey, and salt. Cool to lukewarm. Add softened yeast and flours. Knead well, cover, and let rise in a warm place until doubled in bulk. Punch down and shape into loaves. Place in greased loaf pans. Cover and let rise until doubled in bulk. Bake in moderate oven, 375 degrees F., about 1 hour. Makes 2 loaves.

Editorials

Federation Convention to Convene in Chicago

IT'S NONE TOO EARLY to be thinking about attending the **American Beekeeping Federation Convention** to be held in Chicago, January 25 to 28 at the Sherman Hotel. Chicago, the great convention city of the nation, is ideally located and easily accessible from every point in the U.S.A. and Canada.

It is rumored that Secretary Benson may be the banquet speaker. Allen Kline has consented to give the keynote speech. An interesting and worthwhile program is being planned.

There is important business to be transacted. Our industry needs the help we can give by being present to take an active part in helping to solve some of the problems that confront us. More details will appear later.

Copenhagen International Congress a Success

ACCORDING to reports received thus far, the International meeting was a success, with representatives present from different parts of the world. There were not many from this country, but those who did attend feel amply repaid for having made the trip. A detailed account of the meeting is found on page 664 of this issue, written by Mr. Cecil C. Tonsley, Editor of BRITISH BEE JOURNAL.

It is hoped that in the future more beekeepers from over the world will participate in these meetings and that the beekeeping fraternity in various countries may be drawn more closely together in a common bond of fellowship.

Aster to the Rescue

THERE ARE different kinds of aster in various sections of the country. There are said to be more than 200 recognized species of which at least 125 are found in the United States.

The white field aster, sometimes called frost flower, is common in northeastern Ohio and rarely, if ever, fails to yield a considerable amount of nectar. It comes into bloom the last week in September and continues until late October. It seems to yield best after it is visited by a light frost.

In many instances, it has been a life saver for beekeepers, especially when the summer and early fall flow have not materialized. Bees store honey quite rapidly from this source, the scale hive gaining as much as five or six pounds per day during early October. The honey granulates quickly and should not be left in the honey tank too long before being drawn off. Beekeepers should be thankful for white aster.

About Wintering Bees

IT HAS BEEN said that approximately 20 per cent of the colonies going into winter quarters in the North perish during the winter, or are so depleted in strength in the spring that they are practically worthless. This would appear to be a sad commentary on the ability of beekeepers to winter bees successfully.

Obviously, the majority of beekeepers have not taken time to find out how bees actually live during the cold winter months and what management is neces-

sary to bring the colonies through alive. We occasionally ask experienced beekeepers how bees perform in the hive during cold winter weather and the reply usually is, "Oh, they just huddle together to keep warm". That is a part of the answer but not all of it.

Bees are said to be cold-blooded animals and by that is meant they are the same temperature as the air that surrounds them. One bee, if exposed to a cold temperature for a time, would soon die. A colony of bees on combs of honey in a hive starts to cluster when the temperature in the hive drops to 57° F. As the temperature becomes colder the cluster tightens into the form of a sphere occupying spaces between the combs, the size of the cluster depending on the hive population. As the mercury sinks still lower the cluster becomes smaller. However, the bees on the outside of the cluster form a rim about two or three inches in depth consisting of bees with bodies very close together with heads facing in, while bees on the inside or center of the sphere are clustered loosely and generate heat by muscular activity. The bees on the outer edge or rim retain much of the heat generated by the bees in the center of the cluster. The temperature at the center of the cluster never goes below 57°F. even though the temperature outside the hive may be 20° below zero, or colder.

Beekeepers can reduce winter losses to the minimum by wintering only populous colonies consisting mainly of young vigorous bees, providing an abundance of winter stores of good quality for each colony, and furnishing adequate protection against the elements.

Emergency Queens

THOSE WHO have given some thought to rearing queens know that there are various methods used. In nature where bees are not tampered with, queens are produced by swarming as well as by supersedure. In modern beekeeping some queens are produced by the grafting method which involves transferring worker larvae from worker cells into queen cell cups, using a grafting needle.

There is also what is sometimes called the emergency rearing of queens, which is accomplished by removing a queen from a colony and permitting the bees to rear a queen from a worker larva.

Some try to tell us that good queens cannot be produced by the emergency method. There are differences of opinion on this matter. We have occasionally tried this method and found it quite satisfactory. The queens produced appeared to be as good, possibly a little better than some other queens in the apiary. One disadvantage to this method is that about 21 days are required to rear a queen. from the time the old queen is removed until a young queen appears in the colony and starts to lay.

The reason some condemn emergency queens is based on the assumption that bees may select larvae that are too old and consequently are not fed so lavishly as are younger larvae.

In a bulletin just received from the Bee Research Association of London, England, entitled, "Some Recent Russian Researches on Bees and Beekeeping", translated by Marie Simpson, we note from a portion of it entitled, "New Data on Queen Rearing", by Z. A. Shiniaeva that when bees raise emergency queens, "they mostly do it on white combs and from larvae one to two days old".

A number of queen breeders select one day old larvae for grafting. Our veteran queen breeder, Mel Pritchard, used larvae that were 18 hours old for grafting. Those who wish to find out how Mr. Pritchard secured larvae of this age should turn to page 77 of the February 1932 Gleanings. It would appear that bees may know as much, possibly more, about selecting larvae of the proper age than some of us beekeepers.

We are not advocating this, what might be called a lazy beekeeper's method of rearing queens, but we are simply expressing our opinion that good queens can be reared by this method, provided, of course, the stock is desirable and all conditions are favorable for queen rearing.

Live and Learn

by Propolis Pete

EVERYBODY AGREES that bees in a big colony will produce far more than a small colony, other conditions being equal. Those last four words are the meat in the nut. Bigness cannot be measured entirely by the number of hive bodies piled on a stand.

I had the opportunity of starting off several beginners last spring. My advice was strictly in accordance with the current practice of running big colonies, but it was amazing how many interpretations could be made of what constitutes a big colony.

This was one of those years. The spring was wet and miserable, then followed a severe drought, which was broken by the most rainfall in years. I extracted my honey soon after the first of August, and would you believe that at this writing there has not been enough sunshine to melt the cappings in my solar wax extractor? It's true.

Several of my pupils hived their packages on ten full sheets of foundation. When they came around later to tell me that the first body was full, and to ask for further instructions, I told them to put on another body. That is what I would have done. A little later some came around and told me that the second body also was full. So I told them to put on another, but to look first. At that time my bees were standing still, but some experienced beekeepers told me that their bees were putting up honey, so I thought that it was probably a matter of location.

The payoff came around extracting time. A couple of them asked me to look over their colonies to make sure that they were not robbing the bees too closely. I went along and looked, and found a lot of empty space and very little honey to take. What had happened was that my friends had misinterpreted activity and what to them was a multitude of bees into ideas of prosperity and vast quantities of surplus honey. Instead of looking closely, they had assumed that just because there were bees all through the hive that they were building up. The bees had "chimneyed", that is, they had built out the middle four or five combs in each body, and, the result was maybe 15 or 20 half drawn combs in the center frames of four or even more bodies. Needless to say there was no surplus, and it was quite a problem to reassemble the combs to make a decent place for wintering.

Yes friends, big hives pay high dividends, but only when a big colony occupies them. It seems to me that when a colony of bees is given more room than they can hope to occupy, that they get discouraged and either loaf or expend their energies in the building of a lot of poor combs. Exceptions to this might be when a swarm occupies a big space, but in such cases they build compact comb within the area that they occupy, and let the empty space go until they themselves decide that they need it. Putting a swarm into a hive made up of several deep bodies of foundation is a waste of time and money, that is, of course, unless it is one of those freak swarms that weigh many pounds.

We humans seem to be inclined to go to extremes. We seem to argue with ourselves that if one teaspoonful of salt in the soup is good, a cupful would be better. So it is with big hives. Handled r i g h t l y they will produce crops of honey that would make our ancestor's eyes bulge out. Handled incorrectly they can cause a lot of work, and little results.

I am not saying that we should reduce the size of our colonies. What I am saying is that we should use equipment that fits the needs of the individual family of bees in order to get the best results. Commercial men have to run their outfits more or less on a production line basis, that is, they treat a yard as a unit. But us little fellows can give each colony personal attention to the extent that it is needed, and I think that you will find that if you keep a colony in a house suited to it's size, you will be better off. Crowding is a prime swarm inducement, and too much room is a prime discouragement to some colonies. The happy medium is what you should strive for, which is just another way of saying that success in beekeeping comes from doing the right thing at the right time.

Bee Facts

(A Digest of Scientific Research)

Reactions to Bee Stings

THE AUTHORS review the subject of severe allergic reactions to bee and wasp stings and their treatment. A number of points remain unknown, such as whether sensitization to bee stings implies the same response to wasp stings, and whether desensitization is temporary or permanent.

They recommend strongly that a person showing severe reactions to stings should be desensitized as a life-saving measure in case he is ever stung again. Addresses of several firms supplying bee and wasp extracts for this purpose are given, as well as the doses and dosage schedules. The protein responsible for severe reactions to stings is found throughout the entire body of the insect; the reaction is not a result of the venom per se.

These clinicians describe successful results of their own and of others in desensitizing patients. One case is that of the wife of a beekeeper who developed asthma from mere proximity to bees and who had nearly died from one sting, with shock, giant hives, and swelling of the throat. She was treated with an extract of bee bodies, although the first injection of one drop of a solution of one part bee in 10 million parts of water, caused an attack of asthma and hives. The dose was gradually increased through 30 innoculations. An experimental sting then produced a moderately severe reaction, which was alleviated by epinephrine. More stings were administered at weekly intervals for 12 times, until there was no further abnormal reaction. The patient then submitted herself to stings at weekly intervals in the summer and twice monthly in the winter. She has now been stung a number of times with negligible reactions.

Mueller, H. L., M. D., and L. W. Hill, M. D. Allergic Reactions to Bee and Wasp Stings. New England J. of Med. 249: 726 (Oct. 29) 1953.

Honey for Celiac Disease

IT IS NOT possible to outline a diet suitable for a particular child who has celiac disease (an abdominal illness). The diet must be built up gradually and modified according to the appetite and the ability of the patient to tolerate individual foods.

In building the diet the following foods are offered in the order in which they are named: skim milk; dry cottage cheese; **honey**; egg whites; lean beef, liver, veal, chicken or fish prepared without added fat; very crisp bacon; soybean muffins; orange juice, usually one-half cup; scraped raw apple; **gelatin dessert sweetened with honey; rennet dessert made with skim milk and honey;** puree of asparagus, beets, carrots, pumpkin, spinach, squash, string beans; tomato juice; puree of unsweetened canned or cooked fruit; flaked or puffed corn or rice, and baked potato. Ultimately, less and less cream need be skimmed from the milk.

It is imperative that an adequate intake of vitamins be supplied. Some feel that in view of the impaired absorption from the intestine the aqueous preparations of vitamins are preferable to those that are prepared in oil or oil vehicles.

Your Questions Answered. Postgraduate Medicine 16:A-20 Sept. 1954.

Feeding Habits of Drones

LITTLE IS KNOWN about the feeding habits of drones of apis mellifera. These drones do not fly more than a mile or two from the hive and do not collect nectar.

Caged drones live only one day without food but when sucrose is available they live for three days. In the presence of syrup and worker bees, they live for five to six days.

Drones were separated from worker

(Continued on page 703)

FROM Foreign LANDS

Russian Beekeeping Has Not Reached Pre-war Level

THE MAIN task for beekeeping in Russia, besides honey and beeswax production, is the pollination of fields and orchards. To achieve successful pollination more bees are needed.

Of great importance will be the ability to keep strong colonies ready to be moved into orchards at blooming time. In order to work out this plan, courses are necessary to teach bee behavior and beekeeping since beekeeping on collective farms is by no means a profit-making branch of agriculture.

Although Russia has very large and profitable apiaries, they have only reached 80 per cent of pre-war level and still have very small honey crops. The average honey yield per colony during the past five years has been about 60 pounds. Under these conditions many apiaries had to feed sugar syrup for overwintering. Even though the need for bees for pollination is great, 30 per cent of the collective farms have no bees whatsoever at their disposal. The amount of colonies as well as their efficiency in Russia is not satisfactory.

Every effort has been taken to have bees bring in larger and constant crops. By using two-story colonies the honey yield has been increased 35-45 per cent. On progressive collective farms average honey yields per colony has been 175 to 225 pounds during the past years.

Ptschelowodstwo. January 1954.

Honey as Medication

HONEY INJECTED into the veins will help women suffering from extreme cases of morning sickness during pregnancy. Patients suffering from after effects of radium treatments have also been helped by honey injections. The unbearable itching suffered by people with liver ailments disappeared after honey injections. Honey capsules for injections will soon be sold in European drug stores.

Gazette Apicole. September 1953.

Honey Wine

"SUCCESSFUL WINE MAKING" by S. M. Tritton is a 40-page booklet that discusses wine making in general but also devotes a few pages to mead (honey wine) and its production. It is meant for the amateur wine maker and gives a discussion of the process from the point of view of a chemist. Mr. Tritton has, however, used understandable language for the most part and the booklet will give readers a knowledge of the process.

Two pictures of the equipment which is used are given and there also are some tables which will be of value. Recipes for the production of Dry Table Mead, Strong Mead, Sparkling Mead, Cyser (a combination of cider and honey), and other fruit-honey wines are also listed along with directions for their production.

The booklet may be obtained by writing the Grey Owl Research Laboratories, Almondsbury, Glos., England, at a cost of five shillings plus 6d postage.

Queenless Colonies

QUEENLESS COLONIES are first to start cleaning their hives in spring. Usually they dirty the hive entrance. They run restlessly, searching around and seem to have lost all zeal. When smoke is blown into the hive, the bees start to "howl". In fall, when bees do not kill off drones, there is a strong suspicion that the hive does not have a queen.

Deutsche Bienenwirtschaft

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Our Cover Picture

Here's what a beekeeper's son does after the honey crop is harvested.—Photo by Harold M. Lambert.

Let's talk about honey plants

by HARVEY B. LOVELL, University of Louisville

FIREWEED (**Epilobium angustifolium**) is still one of the most attractive of the late summer honey plants in northern New England. It springs up after lumbering especially if the area is burned over, hence its name fireweed. Improved forestry practices have greatly reduced it in abundance, but it is still regarded as an important honey plant blooming as it does between clover and goldenrod. The honey is water-white with a mild, delicious flavor which blends well with almost any other species.

We watched an interesting patch of fireweed along the roadside in southern New Hampshire on August 12, which was alive with honey bees. The large flowers secrete a lot of nectar. It is too bad that we cannot find some reasons to increase the amount of this plant. Note the honey bee on the lower right hand side of the photograph.

Massachusetts. Coming around a curve near Williamstown in the famed Berkshire Hills of western Massachusetts, we stopped at the Mount Hope Farm, attracted by three rows of massive hives backed by a hill side which had been beautifully landscaped. The farm manager, Shirley Gardner, an old beekeeper, removed one of the covers to reveal standard hives inside. The winter bodies are left on all summer, but the shavings used in winter packing are removed.

The 50 hives are operated for the farm by Walter Witherell, a state inspector. Most of the honey comes from apple, basswood, clover, fireweed, and goldenrod. A store only 100 feet from the apiary, sells among other things, the honey. The extracted honey sells readily at 50 cents a half pint, or $1.50 per quart.

The farm consists of 1700 acres and employs as many as 140 persons. It is owned by E. Parmalee Prentice, a Chicago lawyer, and Mrs. Prentice, the daughter of the late John D. Rockefeller.

Florida. Mr. W. C. Page sends in two plants from Lake City. One proved to be spotted horsemint (**Monarda punctata**) which has clusters of spotted yellow flowers in groups around the stem. This is the honey plant which produces so much mint-flavored honey in many of the southern states.

Fireweed (Epilobium augustifolium).

There is much difference of opinion over the merits of this honey. Most beekeepers who harvest this honey speak highly of it, and serve it on their table. On the other hand large packers generally consider the flavor of mint too strong to be blended with clover honeys and often will not purchase it.

ORREN DAVIS of Gainesville, Florida, wrote me that he has one apiary located in a horsemint area and made 20 pounds per colony in August two years ago.

Mr. Page also sent me a specimen of partridge-pea (**Cassia fasciculata** formerly **chamaechrista**) on which he found his bees working the flowers but not the large cup-shaped nectaries at

(Continued on page 701)

Some of America's Honey Queens for 1954

Miss Joyce Engelhardt, 17, of Antwerp, N. Y. was recently selected "New York State Honey Queen" for 1954 at a meeting of the Empire State Honey Producers' Association. She is standing behind Harold Merrill, Wolcott, N. Y., who was chosen as New York's "Beekeeper of the Year".

Carol Ann Snider, 17, of Canton, Ohio. She was named "Miss Honey", by the Ohio Beekeepers' Association.

Lorraine Eshelman of Lebanon, Pa., was chosen as the Honey Queen for Penna.

A Talk to Beekeepers

M. J. Deyell

My Eastern Trip

DURING THE last week in July and the first two weeks in August, seven of the northeastern states were visited, namely, Pennsylvania, New York, Vermont, New Hampshire, Massachusetts, Rhode Island, and Maine. A little over a year ago I made a trip through the western states, along the Pacific Ocean, also Alberta and British Columbia. One thing I wanted to find out was how much difference, if any, there is between beekeepers in the East and those in the West. We hear it said occasionally that eastern people are somewhat formal and a bit cold while westerners are very friendly and do not stand on formality.

After mingling with both types of beekeepers, I see no difference between easterners and westerners. Isn't it a fact that if we are nice to people they are likely to be nice to us? I do believe, however, that beekeepers are made of a clay that is a little different. They are close to nature, quite observing, and unusually friendly.

On my trips around the country I have had occasion to hobnob with professors and P.H.D.'s as well as large and small beekeepers. Before starting out I take a look at a Spanish proverb that hangs on my office wall, viz, "He who knows little soon repeats it". If I don't open my mouth too often people may not realize how little I actually do know about beekeeping.

Did You Ever Let Your Driver's License Lapse?

Before telling about my trip, I must refer to a little incident that happened before I took off. I intended to start for State College, Pa., early Monday morning. On Sunday afternoon, I thought it would be a good idea to go through my billfold to discard an accumulation of worthless "junk". On examining my driver's license, I discovered, to my horror, that I had overlooked renewing it. In fact, I had exceeded the 90 days of grace. (I just wonder how many of you readers have done the same thing.)

When I went to the drivers' license office Monday morning, I was told that I would have to take a driver's test and that the examiner would not visit Medina until Thursday. In the meantime, it was necessary to secure a driver's permit but this necessitated having a licensed driver in the seat beside me.

I got in touch with the examiner who lives in a nearby town and after telling him my tale of woe he arranged to have me meet him Tuesday morning at 9:00 a.m. in Wooster, about 25 miles from Medina. My daughter, a licensed driver, accompanied me to Wooster.

In the meantime, I thought it would be a good idea to do a little studying on the questions that were likely to be asked, and it was a good thing I did, because it was a stiff examination which included answering some trick questions and driving through a strange city seated beside the examiner, a pompous looking individual but a very nice fellow. Last, but not least, I had to back along side the curb, between two stakes set up. This I managed to do without knocking the stakes down. What a relief when it was all over! I lost two pounds in weight that day. I did not leave Medina until Tuesday afternoon, and had to wire Dr. E. J. Anderson, that it would be impossible for me to stop there.

The next stop on my itinerary was Binghamton, N. Y., to appear on an evening program of the Southern Tier New York Beekeepers' Association. The route to Binghamton took me through northern Pennsylvania. At that time the country looked very dry.

An Interesting Experience

ONE DOES NOT see many hives near the highways. As I drove along, reflecting on this situation, all at once there sprang into view an attractive roadside honey stand. The light was not good for getting a clear picture of it. As I recall, five-pound pails of honey were priced at $1.50 each. Finding no one at the stand, I went to the house nearby and rapped on the door. There was no response. The radio was going full blast. I rapped at the back door but no re-

H. B. Webb, Secretary of Southern Tier Beekeepers' Association of New York.

sponse. It occurred to me that perhaps the beekeeper had been working so hard taking off honey that he had fallen asleep while relaxing at the end of a hard day's work. An apiary consisting of about 35 hives was in plain view across the road from the honey stand. The supers were not piled high. It is seldom I enter a beekeepers' apiary without his permission but I did want to find out just how heavy the hives were, so I took a chance on hefting some of them, thinking perhaps the owner would see me and come out. The hives were light, as I expected. Of course, he may have removed the surplus honey. Failing to rouse the beekeeper, I drove on, concluding the owner of the bees must be in a sound sleep or perhaps had left his home, forgetting to turn off his radio.

Near Wellsboro, Pa., I had a short visit with Allen Scranton, who operates 30 colonies of bees and has an attractive roadside stand, as shown in the picture on opposite page. Mr. Scranton had some well-filled comb honey sections, also honey in jars. At that time the honey flow was still on in that area which had received some much-needed rain.

It has seemed to me that side-line or back-lot beekeepers could dispose of their entire crops by maintaining tidy roadside stands and offering good honey put up in attractive modernistic jars with nice, clean labels that have some eye appeal. A roadside honey stand has to be attractive or the tourists will not stop. Also, there must be space to turn off the road near the stand or cars cannot stop.

The Binghamton Meeting

I HAD NEVER been in Binghamton, N. Y., so when I found a parking space near the leading hotel, I called Mr. H. B. Webb who lives out from the city. He is one of the moving spirits of the Southern Tier New York Beekeepers' Association. He said to meet him at the edge of a suburb. He would be in a red truck by the side of the road where the highways divide. We had never met. In due time I spotted Mr. Webb's red truck. We drove on to his home where a delicious dinner was enjoyed by all. The meeting that evening was quite well attended, considering the season of the year. The honey crop in that area was below par this past season, but the spirit of the beekeepers was good.

One sideline beekeeper, a bus driver, told of his method of selling honey. It seems that he had a few pails of honey, delivering them to one of his customers. People who ride his bus regularly, learning that he is a beekeeper have asked for his honey and thus he has developed an outlet for most of his crop.

Following that meeting a light lunch was served. Mr. Webb and I talked until one o'clock in the morning, as beekeepers will do occasionally. Even the women could hardly get a word in edgewise.

I Move on to Ithaca

While in Ithaca, the home of Cornell University, Dr. E. J. Dyce very kindly showed me around the campus, especially the new Beekeeping Library, a magnificent building. I saw Langstroth's original diary also his letters and manuscripts in his own hand writing. I actually saw the first honey extractor made by Langstroth. There is a room in which many of his earliest inventions are stored, an exhibit which might be called the "Evolution of Bee Smoker", containing the first crude affair on up to the present modern smoker. Also, there are different types of old hives and machines for making comb foundation. I want to visit that room again some day when I have

more time to take in those interesting exhibits.

The Finger Lakes area is usually quite favorable for honey production but this year dry weather shortened the honey crop. In company with Dr. Dyce, it was my priviledge to visit the Finger Lakes Co-op, at Groton, which handles a considerable volume of honey each season. I visited with Harold R. Andrews, the manager.

On to Syracuse

WHILE IN THIS city I visited the office and honey-packing plant of Mrs. E. T. Cary, manager of the A. I. Root Company of Syracuse, which serves beekeepers in that area. The following day, in company with Mrs. Cary, I attended a meeting of the Northern New York Beekeepers' Association near Watertown. The northern part of New York state seemed to have received more moisture than the southern part and consequently the majority of beekeepers were securing fairly good crops of honey. We called on a beekeeper south of Watertown, who had some of the nicest section comb honey I have ever seen. The midsummer flow was still on and colonies were making some gains.

The Watertown meeting was held at the Wahl Bros. adjacent to the St. Lawrence River. If I kept bees in that area, I would be tempted to fish, swim, and go boating instead of working my bees. There is something soul inspiring about the St. Lawrence River.

Dr. W. L. Coggshall was the main speaker at the Watertown meeting and he told about an investigation made recently to determine how much damage the application of DDT does to honeybees. While some bees are destroyed, the damage done is not so great as some may think. According to Dr. Coggshall, it is a little difficult to draw definite conclusions.

The winters in northern New York are very cold. A number of beekeepers transport their bees to the South in order to rear some queens, divide their colonies, and build them up to proper strength for moving back to the North in time to take advantage of the clover honey flow. These migratory beekeepers may secure some surplus honey in the South when conditions are favorable.

Mary Cary, Secretary of Empire State Beekeepers' Association and Manager of A. I. Root Company of Syracuse, N. Y.

There are quite a number of beekeepers in northern New York who winter in bee cellars. At one time the production of cheese was quite common in that section of the state, and dark cellars were used for storing it. In recent years, the cheese business has declined somewhat and some of the cellars are now being used for wintering bees.

It is necessary to have cellars properly constructed in order to winter bees

(Continued on page 695)

Allen Scranton, Wellsboro, Pa., beside his attractive honey stand.

From the Field of Experience

Bees, Bears, and an Airplane

by LOREN STOVER, Umatilla, Fla.

Yes, a bear has helped himself to some honey and destroyed combs and frames.

TO THE CITIZENS of Umatilla, the fact that bees, bears, and an airplane figure in a drama of keen business, coupled with a dash of bravado, is a matter of only casual concern.

So long have neighbors heard Jourdain DeMuth's airplane take off in the early hours of the morning to fly a routine bear damage check over hundreds of bee hives in the Big Scrub, that only an occasional light sleeper will have anything to say about the matter.

Just how did bees and bears get so badly tangled up that an airplane was brought into the picture? We asked DeMuth about his method of protecting a livelihood in the Big Scrub country, which was the locality of Marjorie Kinnan Rawlings' "The Yearling".

"I operate hundreds of bee swarms," said DeMuth, "and have as many as 60 yards scattered over an area of many miles. When the bee yards are set out on locations for the orange blossom honey flow in settled country, bear damage is small. But after the citrus bloom has fallen we must move the yards into the wild scrub land for the ilex and scrub palmetto bloom.

"When the colonies are in the Big Scrub we get into trouble with the bears. Some of the territory is almost as wild as when the Indians and Spaniards had possession. Bears are notorious for their love of honey and my losses were heavy when I had to depend on land transportation since some of the territory is almost inaccessible.

"Now I have the plane. I fly over my Scrub yards and check them for bear damage in the space of an hour or less—an all-day job by truck. If there is damage, I land nearby, when possible, to repair the damage and perhaps shoot the marauder. If the country is too rough for a landing I send out a truck."

I flew the bear run with DeMuth a short time ago, starting at Umatilla and heading northward into the 1,000 square miles of the Ocala National Forest. We seldom flew over 600 feet—even over the deepest part of the Scrub where DeMuth will not risk placing bee yards because it is too wild and there are too many bears. When we passed over a bee yard we dropped to tree top level, banked, pivoted and all but stood the plane on its wingtip for a close inspection.

West of Alexander Springs we found one yard where a bear had been having fun at DeMuth's expense, with hives toppled ruthlessly on the ground. DeMuth marked the spot for a return by truck to repair the damage.

Before close restrictions were placed upon the taking of bear by gun or trap within confines of the Ocala National Forest, DeMuth accounted for as many as 13 bears in one year. Now, he can shoot a thieving bruin only when it destroys hives l o c a t e d on private property.

These bears will do no more harm to hives. That big one must be an old fellow, likely a grandfather.

Honey Bees—Their Origin and Destiny

by ORILL L. PEARSON, Chattanooga, Tennessee

HONEY BEES, according to the biologists, made their first appearance in the Cretaceous, or White Chalk Age, many thousands of years ago. As proof of their contention, the biologists rely on the fact that petrified honeycombs and the fossils of honey bees are found with petrified plants that f l o u r i s h e d in that remote age, for example, the petrified forests of Arizona.

It is reasonable to assume that honey bees evolved simultaneously with flowering plants, such as buttercups, m a p l e s, walnuts, poplars, figs, and many other plants whose floral parts depended on some mechanical means of pollination to reproduce their kind. The two, therefore, are interdependent and inseparable.

The genesis (origin) of the honey bee was different from that of all other creatures. Other insects, bipeds, quadrupeds, reptiles, and many other species of animals, follow the regular order of creation—male and female, except those insects that have both male and female organs within their own bodies. But this procedure could not function in the case of the bees. A drone and a queen could not produce their own kind because they could not care for their young. In fact, they could not even care for themselves, since they had no tools to work with, no instinct to guide them. Left to themselves they would have perished. It was imperative, therefore, that a whole colony of bees be created, not just a queen and drone.

Those early bees were wild by nature, and no doubt built their homes in trees, with no other protection against the elements than the leaves, branches, and body of the tree. Or perhaps they selected a crevice in the rock for their home, or built their combs under an overhanging rocky ledge. They had the same instincts—call it intelligence or blind force—that are characteristic of our bees of today.

Untiring industry, harmonious relations among the workers, ruthlessness in their treatment of the aged and crippled members of the colony, and finally martyrdom to a great cause—

these are the inexorable laws of the swarm.

Economic Value of Honey Bee

The economic value of the bee does not reside in her ability to produce honey, which is merely a by-product of that far greater service—pollination. It is estimated by those who know that honey bees pollinate 83 per cent of all agricultural crops including the fruits. Indeed, so important are they that man himself could not long survive should honey bees become extinct, for the very good reason that no plant can produce viable seed without pollination.

How little we understand the mysteries of nature. Of all the insect pollinators the honey bees are by far the most important. They provide their own food and food for their young, and do no harm to the plants they pollinate. Their activity, it is true, is a response to hunger, but unknown to them they carry pollen from flower to flower as they gather their necessary food. They live in organized communities and are present in sufficient numbers when the first flowers open to pollinate the stigma of the flower. Hats off to the honey bees.

Observations of an Amateur

by C. D. CANNON, Warren, Pa.

I HAVE BEEN setting my hives as closely together as the tops will permit and packing between them with straw. Over the back, top, and extreme ends, I have packed corn fodder and straw and covered it up with waterproof paper. The exposed fronts face to the South so the sun gives them a little heat now and then. With ample food, this has wintered my bees 100 per cent for several years.

There is one little joker in this system. Mice like this handy haven so close to a honey supply, and the answer to that is a dozen or so of those ready-made rat poisons wrapped in wax paper placed in the packing near the front. I do it just as soon as the packing is complete.

Now about the spring feeding. I read somewhere that a little feeding would stimulate early brood rearing, even when the hive had plenty of food, so I tried it. I gave each hive three quarts of dark honey and water mixed two to one. It did give them a lift, and when fruit bloom came on two hives were given half-depth extracting supers. What did they do? They carried the dark honey up into the supers, enlarged the brood nest and fed all that nice apple nectar to the brood. That was last spring and I have not yet figured out the counter move.

Top, or extra, entrances seem to be generally approved, but I don't like to bore holes in my equipment. In a short time I am sure I would want the bored bodies or supers where a hole is undesirable. Instead, I make a frame three-eighths inch thick, just the size of the hive body, but leave an opening four inches wide for the front. Across this space at the top I put a strip of sheet metal to hold the loose ends steady. I use this just below the inner cover most of the time and keep the roof pushed forward to give access to it. I have used it in various places, but the bees seem to prefer it at the top.

Another one I can't answer is the lack of nectar at certain times. Last fall, there were three weeks in late July and early August when we had a fair bloom on weeds and second crop clover, but no honey coming in. The flight of field bees was slow and rather aimless. Brood rearing was reduced and bees clustered over the entrances all day, but there were no queen cells and no swarming. The clustered bees were apparently the cooks and chamber maids out to get a little air, and waiting for trouble at the same time.

I have been averaging a little over 100 pounds of extracted honey per hive, but don't have the selling matter quite in hand. My wife cares for most of that, through friends and a classified ad in the local paper now and then. We are going to try a different approach this year, but if it works, some new problem is sure to pop up.

Even with a few bees, there is never a dull moment. Every time I look at them I see something new and wonder why they do or don't do this or that.

[Regarding a top entrance, why not cut a small opening, about two inches wide, in the front of the rim of the inner cover, then turn this inner cover upside down, then push the outer telescope cover forward as far as it will go to allow a space for bees to fly out and in.—Editor.]

Controlling Hornet Damage in Apiaries

by GEORGE P. GEORGHIOU, Cyprus

IN FACE of determined attacks by hornets, desperate endeavors are sometimes required for defense of the hives. Stalwart resistance is made with makeshift weapons, sometimes with a thorny branch or a board. One beekeeper dispatched, in his own beeyard, over 2,000 hornets in a day and over 10,000 in the week. But the attack persisted; furthermore the disturbance excites the bees, making them, in some cases, unapproachable for days.

Attack is the best form of defense in this case, and that means locating the nest and destroying it. Since hornets can fly distances of up to two miles or more, the entire area within about two miles from the bee yard is involved. The search is best done in late afternoon when the hornets are flying low and slowly, and may easily be followed to their nests. The nests can be destroyed by blowing in a small quantity of calcium cyanide dust with an ordinary duster.

Please consult the Extension Service in your area if you need a demonstration. Calcium cyanide is a poison and should be handled with care. Avoid breathing the dust and vapor especially indoors.

In addition to destroying the nests, some beekeepers use a small wire screen at the hive entrance which will allow bees to go through but will keep the hornets out. This works well with weak colonies; strong colonies will cluster out of the screen on the landing board and still be exposed to the hornets.

Ants may also become troublesome at this time of the year. The beekeeper may protect his bees by locating all the nests within a radius of 50 meters from his bee yard and dusting them thoroughly with DDT or BHC dust. Drenching them with a suspension of these materials or with kerosene or burnt engine oil is also very effective. If ants continue to be bothersome, the hives should be placed on stands, the legs of which stand in pans of kerosene or oil.

Why Not a Stamp for Honey Bees

by GEORGE S. WOOTTEN, Chicago 45, Ill.

IN THE LAST few years the United States Postal Department has gone all out for commemorative stamps.

Some of them are: Future Farmers of America, 4-H Club, American Automobile Association, Trucking Industry, and recently George Eastman's 100th Anniversary.

Why not a Lorenzo Langstroth commemorative?

Among the many beekeepers here in the United States, there must be many who are stamp and first-day cover collectors or some member of their family who is. There are enough beekeepers who if interested in a commemorative stamp could drop a two-cent postal to Postmaster General Summerfield, Washington, D. C., to get a commemorative in time for next year's convention.*

The large size such as that of Future Farmers of America and the 4-H Club stamp could be used. A picture of Rev. Langstroth up in one corner and the Andover, Massachusetts plaque could occupy the center of the stamp or an open hive with someone holding a frame of honey with the bees on it. The first day issue could be in Andover on the same day the convention convenes, or first day issue could be in the city in which the convention is held.

The American Honey Institute could get a little extra cash by running a cachet.

The stamped and self-addressed envelope plus 10 cents or 20 cents for each cover wanted is the easiest way to handle it. In that way only the cachet would have to be stamped or printed on the envelope.

Nearly all of the newspapers have a stamp and coin corner in one of their issues. I do not think they charge for notice in the column. Give them the information a week or so in advance. In this way not only beekeepers but outsiders will send for them.

Besides, a stamp is also a good plug for honey.

* It would be better to write to a U. S. Congressman for a commemorative stamp must be sponsored by Congress.—Editors.

Very Late Queen Replacement is Normal

by WAYNE KELLER, Oshkosh, Nebraska

I HAD mated queens in nuclei in October successfully in a minor location affording few drones. Later, when using a hybrid strain I liked real well, I decided to divide with a single screen in September, allowing whichever unit was queenless to replace naturally. Imagine my surprise to discover after a month that the normal percentage of virgins were laying, whether reared above or below. They wintered well, but of course took longer to build up in spring. I hit upon the plan of using supers too light to extract as units for introducing four-frame nucs above two-story colonies. Some bees and honey give the four-frame nuc a tremendous boost, and both units winter better. This holds up colonies that get strong too early in spring.

Old queens are no more economically replaced than by requeening with the dividing screen in the fall. Ordinarily robbing hinders winter preparations, and one does not get all nuclei united or divisions checked for queens. I hesitated to start a colony to replacing its queen, or rearing one in a division, after September 15, lest cold retard mating, or late inspection fail to determine whether the queen had mated. One sometimes looses both divisions, unless he unites.

Recently I have seen so many queens safely begin laying in October that I have no fear. A fall-reared queen is well fed, which is not likely in early spring without grafting. Fully 30 days from dequeening should be allowed before checking for eggs of the replacement queen. One must know by record which division has the old queen, as they cease egg laying early. In divisions marked for late checking one will find a little patch of brood and active young queen unless the queen is lost.

I Feed Honey Instead of Sugar

by JOSEPH RUEL, Fifty Lakes, Minnesota

MY HONEY extractor is too small for Jumbo frames. I wanted to extract the honey from some of the frames in order to feed to the bees without giving them the whole frames of honey in their brood nest (the frames are not full), because I did not want to disturb their brood nest or let them rob out the honey in the open.

Instead, I wanted to let them rob out the honey from the frames in their own hives and place the honey wherever they wanted it. To put the frames of honey in another hive body, either underneath or above the colony to be fed, does not seem to work fast enough nor in a satisfactory manner.

To accomplish my purpose then, I had to make a frame the size of the top of the hive by two inches high out of ¼ inch material, such as orange crating. By using ¼ inch material I can then lay a Jumbo frame flat on the top bars of the brood nest with a ¼ inch cleat under each end of the frame and replace the cover on the two inch high frame. This way robbing is not started and it is not necessary to feed in the open, which generally makes the bees somewhat cross, and at the same time the honey (their own) is in their winter nest as they want it, and that too, without disturbing their winter nest.

The reason I do this is because I believe honey is far better than sugar syrup to winter on and at the same time I get the frames cleaned up of whatever honey is in them. The full combs of honey I set aside for next spring's use after I have the bees well supplied with honey to winter on.

You can feed the bees in the spring to stimulate them to build up quickly by placing one frame of honey, more or less full, flat on the top bars of their brood frames. It stimulates the bees and queens when so fed to much greater efforts to build up quickly. You see, this frame of honey is in the warmest part of the hive next to the cover and the queen will lay eggs in this frame also, even though it is flat on one side, as I have mentioned elsewhere. No entrance feeding or extra hive bodies to enclose the sirup pails are needed or used.

The bees generally carry down what-

ever honey is in the frames by the next day. Some colonies carry down honey only from one side (top side), of the frame as it lies flat on top of the top bars of the brood nest. In that case I simply turn the frames over on the other side. They will carry it down then since it is uppermost.

Before laying the frames of honey on the top bars, be sure to run your hive tool over all the cappings on both sides of the frame, bearing down hard enough to crack or crush the cappings good so the bees will carry down all the honey.

If the cappings are not cracked or crushed the bees sometimes will not carry down all the honey, especially that in the capped cells. By giving the bees only one Jumbo frame (or any frame) at a time to clean up late in the fall, then the bees take it all down immediately because they have no extra hive of combs to warm up at the same time, just the one frame on the top bars and underneath the cover.

The Last Roundup

by M. J. DEYELL, Editor

MY "TALK TO BEEKEEPERS" this month doesn't mention apiary management, so I feel as though something should be said, especially for beginners about wintering bees.

Those who have experienced a good honey flow and have populous colonies well supplied with good quality stores properly placed need not worry too much about wintering. I'm concerned about those of you who live in drouth areas where bees did not store a sufficient amount of honey and pollen for winter stores and may starve during the winter if not fed.

As mentioned in an editorial on page 608 of the October, 1954, Gleanings, it would be folly to waste sugar on weak colonies that consist mainly of old bees. Such colonies are likely to die during a cold winter, regardless of how much food and protection they have.

Weak colonies can and should be united in the fall but I have found that subnormal colonies, even though they are united late in the fall do not amount to much, as a rule. Perhaps some of you experienced beekeepers have had similar experiences along this line. Colonies that are below normal strength should be united early in the fall to give the bees a chance to get well established before cold weather comes.

Feeding, when necessary, should be done, preferably during October in northern latitudes. However, it can be done during early November when the weather is mild enough to permit bees to take the syrup. Do not try to use an entrance boardman feeder for late feeding. This type of feeder does all right for warm weather feeding. For feeding syrup in cool weather use the inside division board feeder or a friction-top pail feeder.

To use the latter, punch about a dozen holes in the cover of a five or ten pound honey pail, using a two-penny nail. Fill the pail with hot sugar syrup made of two parts granulated sugar to one part water. The pail of syrup is placed over the hole of the inner hive cover with the cover of the pail facing down so that the bees can get the syrup through the holes. If the hive does not have an inner cover, place the pail of syrup over the tops of the frames. Put an empty super or a tight-fitting box over the feeder to protect it from the weather and robber bees, then the outer cover is placed on top. Reduce the hive entrance to winter dimensions—about three or four inches by three-eighths of an inch to exclude mice. Be sure to remove the feeder pails after the bees have taken the syrup.

De-skunking

by GEORGE D. CURTIS, Ramona, Calif.

GLEANINGS method of pouring Cyanogas into a box is an ingenious method of "de-skunking" but I think a simpler one is to tie about 20 feet of string to the end of the trap-chain and stretch the string out straight. When the trap is sprung you can draw both trap and skunk into the open, standing at a safe distance, and then shoot him. If you pull gently he won't exude until after he's shot, and the length of string and chain gives you enough clearance. But of course this method could not be used in a district where it is unlawful to discharge firearms.

B & Z LIBRARY

Bees at Home

by WM. PENN MOTT, JR., Superintendent of Parks, Oakland, Calif.

THE OAKLAND Park Department, through the cooperation of the Alameda County Beekeepers' Association, has installed in the Rotary Natural Science Center in Lakeside Park, an unusual type of hive unlike the commercial hives seen by children on ranches, in back yards, or roof-top apiaries throughout California.

The hive we refer to is a vertical one designed to resemble the natural home of wild honeybees in hollow trees. This exhibition hive, with an exit out of doors, was developed in connection with the Junior Museum in the Rotary Natural Science Center. Although the hive would be illegal for commercial use because it lacks removable frames for inspection, it does serve as an ideal visual teaching aid. About 30,000 bees are seen at work in this colony. The constantly changing combs provide an ever increasing feature of interest to the 300,000 people who went through the Natural Science building this past year.

With this hive and through the special lectures provided by the Alameda Beekeepers' Association, we have been able to create a great deal of interest in honey bees. Visitors to the museum are constantly amazed by the fact that honey bees are able, even in the densely populated metropolitan center of Oakland, to find sufficient food and material to build their hives and store honey. Each year the honey is extracted and made available to the children's hospitals in this area.

A Simple Way to Get Good Queens

by A. L. SANDERMAN ALLEN, Suffolk, England

I AM what we in England call a hobbyist beekeeper, and I think Americans call a backlot beekeeper. I keep two dozen hives which I find to be just enough to keep me busy on Saturday afternoons. But 24 hives is not enough to give a man a chance to become really good at some of the more intricate work, especially the job of grafting grubs for queen raising.

The grubs supposed to be chosen are those with plenty of brood food, but sometimes there are not any of these in the breeder's colony when we get one of those spells of bad weather which visitors to England complain about. Even when there is a fair lot of brood food in the cells, it takes quite a lot of practice before an ordinary ham-fisted amateur can graft a dozen grubs quickly and well. Too much time taken results in poorer acceptances and not so good queens.

I was pleased to read about Hillier's method of getting plenty of brood food into the cells before grafting. If a comb of just hatching eggs is placed horizontally above the brood chamber of a starting colony, the bees will select a number of grubs to build queen cells around, and will start by loading these cells with royal jelly. By the next day quite a number of grubs will be floating on white beds of royal jelly and are so much easier to transfer.

One Saturday I tried this. On Sun-

day when I wanted to graft, it rained steadily all day. The following week-end was terrible, and I just hate bee-keeping in the rain. When the week end after that (14 days after the grubs had hatched from their eggs) was getting near, I reasoned that the first virgin to emerge would fly away with a swarm. Perhaps a second and a third would follow with small swarms, and leave my cell-building stock in a useless state. I could not leave my regular work to go home and cut the cells from this comb, so I reasoned that my best plan was to slip in a couple of queen excluders one evening on returning home. At least this should keep the bees and the first emerged virgin at home until I could "fix" that colony on Saturday, unless of course the virgin found a way through two excluders.

On Saturday morning those bees were in a state! There was a swirling mass of bees round the hive, and bunches were forming in the hedges, breaking up when they found themselves queenless and reforming in other places. When I looked into the hive I found the workers had all the virgins but one penned up in their cells. I took that comb out quickly and helped one virgin to release herself. She ran like a greyhound off a leash and I felt relieved when I was able to catch her before she took off to join the party in the hedge. In five minutes I had ten virgins safe in match boxes—it was as easy as that. Two more virgins I held between my lips temporarily (I cannot hold queens long there—they tickle), and I had to destroy the others because I had no more boxes handy. It was a pity to do this to virgins which had been brought up to be queens from the moment of hatching, tended by bees of a strong colony and left in that same strong colony from eggs until emergence, even though the rest of them would have to be given away.

The next time this was tried, one virgin resulted. No attempt to swarm was made. This second effort was not made by me—I had enough virgins- This idea does **require** the bees to try to swarm. If they do not try, then only one virgin is all you get for your pains.

I am sure this idea gives first rate queens, but I am equally sure it can be improved. The building of the cells could be done above the supers of a strong queenright colony, perhaps as effectively. When the virgins are nearly ready to emerge, if the comb is moved to a colony with sealed swarm cells already in it, it may give a better chance of having the bees pen those virgins in until the beekeeper comes around. There must be plenty of room for improvement.

I cannot promise that this idea works unfailingly in England. How it would work in America I must wait and hope to hear.

Stop the Destruction of Bee Pasture

by OTIS K. WOLFE, Harlan, Kentucky

I WAS especially interested in October Gleanings editorial on destruction of bee pastures on roadsides throughout the country. I am located near the Virginia State border and I have some bees in the country and even along the back country roads they mow the roadsides every season just about the time sweet clover blooms. I cannot for the life of me understand why. Also there is considerable other plants that appear from season to season that are also mowed down. It seems to me that they could wait until late August or even September to do their mowing and this would be enough to keep the roadsides nice.

Here in Kentucky, the L & N RR, just across the river has for the past two years burned the railroad right of way with the 2-4D or other weed killers, and I see no use for this. It not only looks terrible as if a fire had burned over the entire area but it destroys plenty of good bee pasture. Most of which are weeds that do not ever reach more than a foot or two in height. This spray kills a lot of bees too, for they may spray it at a time when bees are flying most.

I believe the beekeepers of the country should voice their opinions on this to the Highway Commissioners of their respective states and the Railroad Companies. Might do some good as they might let up on their mowing and spraying till the proper time, if there is a proper time for such destruction.

Michigan Apiary Law Held Valid by Supreme Court

by DON P. BARRETT, Michigan State Apiarist

IN REPORTING this decision, I believe that it is significant, in that many people throughout the country interested in the apiary business were awaiting word regarding this test case. As far as I know or have been able to ascertain, it is only the second Supreme Court's decision in any case affecting Apiary Inspection Laws in any state in the Union and the first affecting the importation of bees on comb into a state.

In a recent test case instituted by an Ohio honey producer against the Michigan Department of Agriculture, a recent decision was filed last week with the State Attorney General. This decision held the Michigan Apiary Law, barring the importation of bees on comb and used beekeeping equipment was constitutional.

The section of the law involved and the Court's decision are as follows:

"It shall be unlawful for any person, firm, corporation or transportation company to bring into this state any bees on combs, used hives or used apiary appliances from any other states or other countries: Provided, however, that common carriers may transport bees and apiary appliances through this state if the shipment originated outside of this state and is destined for some point outside of it.

"**** In addition to the penalties, hereinbefore provided, bees on combs, used hives or other used apiary appliances brought into this state in violation of the provisions of this act shall be confiscated and destroyed."

Supreme Court's Decision

It clearly appears that inspection of bees and honey involves a different problem than the inspection of large animals. The act in question does not bar the importation of bees and honey, but bars their importation in combs, and in used hives and equipment.

In our opinion the State, in the exercise of its police power, has the right to regulate the manner by which bees may be imported into Michigan. The requirements under the act are in the interests of public health, and as such are within the constitutional provisions. The decree of the trial court is reversed and the injunction heretofore issued is dissolved.

Controlling Robber Bees

by WALTER R. PLATT, Mt. Kisco, N. Y.

LAST SPRING one of my colonies was robbed by another. This initial robbing was brought under control by the usual methods of contracting the entrance, piling some grass over it and some brush in front of the hive.

Now for some reason the robbing colony never got the evil out of its system. Although the defending colony seemed to be able to hold its entrance with the smallest hole in the entrance cleat, as the weather warmed up the colony became hotter and hotter, bees milling around the entrance, and work generally slowed down. If the entrance was opened robbing would start again.

I cut a piece of window screen as long as the hive is wide, and about three inches wide. I placed this in the entrance of the defending colony, just high enough off the bottom board so that the bees could crawl in and out.

The defenders seemed able to handle this entrance, and the morale of the colony was certainly much better with the larger air supply.

"George likes his honey REAL fresh."

American Honey Institute News Notes

by HARRIETT M. GRACE, Director
Commercial State Bank Building, Madison 3, Wisconsin

What the AHI Means to the Small Beekeeper

BIGNESS is the byword of business nowadays. But it is not the heart of business, not here in America, at any rate. The heart of American business is lodged under its bulky exterior down where each small little private enterprise is begun.

So it is in the honey business. Taken as a whole we are large, one of the greatest honey-producing countries in the world. But break us down into jigsaw parts and you will see that it is the small beekeeper who makes up the vast bulk of business.

It is to the small beekeeper then that we offer a salute.

But perhaps we should put quotation marks around the word "small". Once a man penetrates the mysteries of the bees, one hand clutching a bee veil and the other firmly g r i p p i n g a smoker,—once he faces the horrors of the hive and emerges, lo! unstung!—once he learns how to delve into a super with a deft and delicate touch and finds the bees amenable to his advances,—once he enters the dazzling court of Her Majesty the Queen and is introduced to her devout workers—then the beekeeper and his bees take on a kinship as mysterious to an outsider as the marvels of honey-making itself.

No matter how small a honey business, the joys of beekeeping loom large.

We at the American Honey Institute know this. Year after year we watch our membership list grow, swelled by the ranks of those beekeepers who just thought they'd dabble in the sport of keeping bees as a hobby, as a pin money maker, as a relief from the strains of other work. They come for diversion, and they stay.

A particularly encouraging sign in this strange romance of the small beekeeper with his bees is the aggressive way these small beekeepers become a part of our industry. Every day brings us a new letter from one of them, wishing to become a part of our organization, seeking new outlets for honey, desiring to learn in a great hurry all the small twists of running a business that it normally takes many years of experience to learn. They are eager, these small beekeepers, and they are willing and ready to learn. We applaud them for that.

They come to the right place when they come to the American Honey Institute. They seem to sense that in unity lies the strength of an industry like honey, and they wish to become an integral part of that industry. The Institute offers them real membership in the industry, and a chance to make close acquaintances with other honey men.

THIS SENSE of belonging, then, is the real advantage of membership in the AHI to the small or part time beekeeper. We count these advantages too:

A chance to receive the helpful promotional material that the Institute prints and distributes. Chief among these are the recipe leaflets and books, which are sold to Institute members at the cost of printing them.

An opportunity to get an index of other progressive beekeepers through the members' directory, which is sent to each paid up member at the beginning of the year.

Close touch with the organization which is promoting honey on a national basis through news releases on honey uses to newspapers, radios, and television stations.

The chance to observe that in the honey business, most entrepreneurs are small businessmen, and usually start out with only a few hives. Many members are small beekeepers. There is no need to hide your size from scrutiny, for you will find much company in the membership files of the American Honey Institute.

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"A theorist is one who doesn't work; but has a lot of ideas that he thinks will work."
Taken from Beekeepers News August 1954.

Just News

The annual convention of the **American Beekeeping Federation** will be held the last week of January at the Sherman Hotel in Chicago. The **Cook-Dupage Beekeepers' Association** will be hosts. Complete details will appear in a later issue.

The **Georgia State Beekeepers' Association** will meet Monday and Tuesday, November 29 and 30th at Valdosta. Valdosta is on route 41 and is directly north of Orlando, Florida, where the **Southern States Beekeeping** meeting will be held December 1, 2, and 3.

The 35th Annual Banquet of the **Lorain County Beekeepers' Association** will be held November 13, 1954 at the Herrick Auditorium at Wellington, Ohio.—Roscoe F. Oney, Sec.-Treas.

The **Southern Tier Beekeepers' Association** of New York, will hold their next meeting November 9th at the C. L. Reynolds Radio and Appliance Sales Room, 25-27 Sturges Street, Binghamton, New York. An election of officers will be held at this time. Movies will be shown.—H. B. Webb, Secretary.

The annual meeting of the **American Bee Breeders' Association** is tentatively set for Jan. 8th, 1955 at Forrest Hotel, Hattiesburg, Miss. Make your plans to attend. Invitation extended to all beekeepers. Further details and program schedule will be announced in the December Bee Journals. All package men and queen breeders take notice.—N. C. Jensen.

The **Empire State Beekeepers' Association** will hold a two-day winter meeting on December 3rd and 4th at the Hotel Syracuse, Syracuse, New York. James I. Hambleton, U.S.D.A., bee specialist, Mr. R. B. Willson of New York City, Cornell Beekeeping Scientists, and other noted eastern beekeepers, will participate at the program.

The annual convention of the **Manitoba Beekeepers' Association** will be held at the Airport Hotel in Winnipeg on Monday and Tuesday, November 15 and 16.—D. R. Robertson, Sec'y.

The annual meeting of the **Iowa Beekeepers' Association** will be held at Ames on November 17 and 18 in conjunction with other affiliated organizations of the State Horticultural Society. The first day will carry two topics of the panel type discussion on the hybrid bee and what the future holds. Speakers of national position will occupy the first half of the second day and the second half will be devoted to a business session. Anyone who is interested in beekeeping is invited to attend these sessions.—F. B. Paddock, Extension Apiarist.

The **Westchester County Beekeepers' Association** will hold its next meeting Sunday, Nov. 21, 2:30 P. M. at the Odd Fellows Hall, 20 Lockwood Ave., New Rochelle, N. Y. A fine program has been arranged so all members and friends are urged to be present.—Carlton E. Slater, Publicity.

The **Washington State Beekeepers' Convention** will be held in Wenatchee, Washington on Nov. 30 and Dec. 1. There will be a board meeting the evening of Nov. 29th and registration for the convention at 9 A. M. on the 30th.—Mrs. Carl W. Van Wechel. Sec.

The next meeting of the **Middlesex County Beekeepers' Association (Mass.)** is scheduled for Saturday, Nov. 27, at the Waltham Field Station. We will resume our practice of having a "pot-luck supper" before the business meeting. These suppers have become very popular with the members.—L. C. Proctor, Secretary.

The Annual convention of the **California State Beekeepers' Association** will be held at Bakersfield on Dec. 7 and 9 at the Hotel el Tejon. The program will center around pollination, marketing, pesticide programs, and apiary management. This is to be an open meeting to which all growers,

pesticide interests, and beekeepers are invited.—J. E. Eckert.

The **Illinois State Beekeepers' Association** will hold its 1954 Convention on Nov. 5 and 6 in Springfield, Illinois, at the St. Nicholas Hotel. A fine program of speakers has been arranged. There will be a banquet the evening of the first day.—Hoyt Taylor, Sec.

The 34th annual meeting of the **Montana State Beekeepers' Association** will be held at Burke Hotel, Lewistown, Montana Dec. 3 and 4. A new idea this year will be the free distribution of Honey to restaurants and hotels to be served to all customers during the convention.—Mrs. O. R. Burdett, Sec'y.-Treas.

The 75th annual meeting of the **Ontario Beekeepers' Association** will be celebrated at the King Edward Hotel in Toronto on November 29th and 30th and December 1st. The program will include many prominent speakers, such as Mr. J. I. Hambleton, Dr. William Coggshall, Dr. W. E. Dunham, Dr. C. A. Jamieson, and others. One of the highlights of the meeting will be a banquet on the evening of November 30th. All those planning on attending should advise the Secretary, Ontario Beekeepers' Association, Ontario Agricultural College, Guelph, Ontario, as soon as possible.

Southern States Beekeepers' Federation and the Florida State Beekeepers' Association Orlando, Florida, December 1-2, 1954 at the Orange Court Hotel

Wednesday, December 1

8:30 A.M. Registration

9:30 A.M. Call to Order—President A. D. Hiett presiding, Martinsburg, W. Va.
Invocation — Reverend Russell A. Martin, Orlando, Fla.
Announcements

9:45 A.M. Welcome—Honorable J. Rolfe Davis, Mayor of Orlando.
Recognition of Mr. Roy E. Novinger, President, Florida State Beekeepers' Association, Oxford, Florida.

10:00 A.M. President's Address —A. D. Hiett.

10:30 A.M. How the Honey Price Support Program Benefits the Beekeeper—Harold J. Clay, Sugar Division, Commodity Stabiliation Service, U. S. Dept. of Agri., Wash., D. C.

11.00 A.M. Results of Twelve Years Research with Bee Stings on Arthritis and Neuritis—Prof. F. E. Guyton, Ent. Dept. Ala. Polytechnic Institute, Auburn, Alabama.

11:30 A.M. Preliminary Business Sessions and Appointment of Committees: Southern States Beekeepers' Federation, Florida State Beekeepers' Asso., Florida Honey Packers' Asso.

1:30 P.M. Call to Order—Vice President Lynn M. Dewey, Merritt Island, Florida.
Recognition of Representatives of bee journals and bee supply companies.

2:15 P.M. Royal Jelly and Human Nutrition—Dr. Ouida D. Abbott, Head, Home Ec. Dept., University of Fla., Gainesville.

3:15 P.M. Open Discussion Period—A. V. Dowling, Leader, Valdosta, Georgia.

Thursday, December 2

9:00 A.M. Call to Order—A. D. Hiett, President.
Introduction of Special Guests and Visitors.

9:10 A.M. Attracting and Selling the Customer — J. D. Clement, Southern Regional Merchandising Mgr., Owens, Ill. Co., Atlanta, Georgia.

9:40 A.M. The American Honey Institute and Southern Beekeeping—Mrs. Harriett M. Grace, Director, American Honey Institute, Madison, Wisc.

10:10 A.M. Nectar Production by White Clover and Sweetclover Blossoms—Dr. Everett A. Oertel. Southern States Beekeeping Laboratory, Baton Rouge, La.

10:40 A.M. Florida's Nectar and Pollen Plant Introduction Program —Dr. F. A. Robinson, Assistant Apiculturist, Fla. Agri. Exp. Sta., Gainesville, Fla.

11:00 A.M. Panel Discussion, Bulk Comb Honey Packing and Marketing—Leslie M. Lewis, Panel Leader, Havana, Fla. (Other members to be announced).

1:35 P.M. 1954 Activities of the American Beekeeping Fed.—H. A. Schaefer, Pres., Osseo, Wis

2:00 P.M. The Florida Honey Co-op.—D. E. Sojourner, President, Orlando, Florida.

2:20 P.M. A commercial Honey Producer Looks at the Honey Co-op—Byron F. Freeman, Thonotosassa, Florida.

2:30 P.M. What the Co-op Means to the Small Honey Producer—C.A. Connell, Winter Garden, Fla.

2:40 P.M. Ideas on Honey Selling—Roy E. Novinger, Pres. Florida Beekeepers' Asso., Oxford, Florida.

2:50 P.M. Final Business Meetings:
Southern States Beekeepers' Federation
Fla. State Beekeepers' Asso.
Florida Honey Packers' Asso.

The Florida State Beekeepers' Association is serving as host to the Federation.

The **Oregon Beekeepers' Association** will hold its annual meeting in the Medford Hotel in Medford, Oregon on Dec. 3 and 4.—Delmar Smith, Pres.

(Continued on page 700)

Asked & Answered

Queens Lay Eggs in Queen-cells

Question: Does the queen deposit an egg in each queen-cell or do worker bees remove eggs from other cells and place them in queen cells?—Washington.

Answer: So far as is known, the queen lays the eggs in the queen-cells under normal conditions. On the other hand, there is considerable evidence that under certain conditions eggs are transported from one part of the hive to another and placed in queen-cells. Some even believe that a colony that is hopelessly queenless may steal eggs from another colony and carry them home to put into queen-cells.

Corn Fodder for Winter Protection

Question: Is it a good plan to set shocks of corn fodder around each hive to protect the bees in winter?—Ohio.

Answer: It will be better to set the fodder along the fence, around the apiary, for a windbreak, and pack the hives in the usual way, than to place the fodder around the hives. Fodder is entirely too loose for winter packing since currents of air can penetrate through, to some extent. To set shocks of fodder over the hive would deprive the bees of the benefit of the sun shining on the hive, and at the same time not afford much protection so far as retaining the heat of the hive is concerned. Fodder can be used to form a windbreak around the apiary, but it can not well be used as a substitute for winter packing.

Colonies Too Strong for Winter

Question: When fall comes I have four or five supers full of bees and there is not room enough for them in one hive body. I can not winter them in two hive bodies in the cellar, so last season I brushed the bees from all the supers except the lower ones and drowned them. Did I do the right thing?—South Dakota.

Answer: No. If there are too many bees for one hive body a super containing empty combs or a little honey (in many cases the last super given, which has been only partly filled) should be given to each colony when the honey is removed so that there will be room in the hive until the approach of cool weather in the fall. As cold weather approaches even these large colonies will have no difficulty in crowding into a single story, and large colonies, as a rule, winter better than small colonies.

Winter Passages Through Combs

Question: Is there anything gained by making holes through the combs to permit the bees to pass from one comb to another during winter? Some of the bees in my colonies perish on outside combs during the first cold spell in the fall.—Minnesota.

Answer: In the early days of the modern hive, winter passages through the combs were thought by many to be necessary for best results in wintering. Langstroth, in his book, "The Hive and the Honeybee", advised that a hole an inch in diameter be cut in the middle of each comb about one-third of the distance from the top, this being done so late in the season that the bees would not fill these holes with comb. Later this practice was abandoned almost entirely and a device known as the Hill's device was placed above the frames to hold the quilt, then so commonly used, an inch or more above the top bars, the theory being that the bees would cluster in this space and thus have a free passage from comb to comb. However bees get along very well without either arrangement, especially if the colonies are strong and well protected, and both of these methods have been abandoned. When bees are wintered in two stories the cluster can expand or contract laterally through the space between the upper and lower sets of combs.

Confining Bees in Hives During Winter

Question: Last winter I fixed my colonies in the attic with a wire screen over the entrances inside for ventilation but closed from out of doors. In December they became quite restless and the dead bees nearly closed the entrance. What was the cause of their restlessness?—Michigan.

Answer: The bees were restless because they were imprisoned within the hive. The entrance cannot safely be closed in this way during the winter even when the bees do not fly, because as soon as they discover that they cannot escape from the hive they become greatly excited and soon die in great numbers from exhaustion. It is necessary to leave a small opening at the entrance during the winter.

Placing Bees in the Cellar

Question: When is the best time to put bees in the cellar for winter?—New York.

Answer: The best time to put them

in is just after they have had a good cleansing flight in late fall. As a rule, the bees are not anxious for a cleansing flight early in November and are not tempted out in great numbers by suitable weather; but after they have been confined to their hives a couple of weeks they will fly in great numbers on the first fine day, probably nearly every bee going out at some time during the day. If the next day is cold, this is the time to put them in, even if it should be before the middle of the month. As a rule they should not be left out later than November 20. If the day is cloudy and the temperature near freezing just after the bees have had a good cleansing flight the hives can be carried into the cellar without smoking at the entrances or closing them, since under these conditions the bees are inclined to be quiet. It is well to avoid putting them in on a bright sunny day if possible, since they are then more easily disturbed than on a cloudy day. The hives should be handled in a manner to cause the least possible disturbance, since poor wintering may result from too much disturbance at this time.

Brown Sugar for Feeding

Question: Is it advisable to use brown sugar for feeding bees?—Ohio.

Answer: Not so long ago we tried to economize by using brown sugar instead of white granulated sugar for making syrup for bees. We found that the bees would not take the syrup. Granulated white sugar is the best substitute for honey as a bee food, especially for winter stores.

Aster Honey as Winter Stores

Question: I have 150 colonies supplied with 30 to 40 pounds of fall honey partly from aster. Is this honey safe for winter stores, or should I extract it and feed sugar syrup.—Tennessee.

Answer: Aster honey, if well sealed in the combs, is usually a safe food during winter if the colony is strong. Wherever the bees are able to fly freely every week or ten days during the winter, they should winter well even when using poor stores. In localities where the bees are confined to their hive during the winter for several weeks or several months, without a flight, honey gathered from fall flowers is not as good as light-colored table honey. Buckwheat, an almost black honey, is excellent as a winter food.

A TALK TO BEEKEEPERS

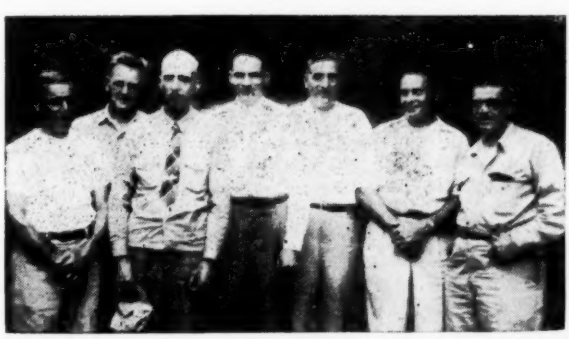
(Continued from page 681)

successfully. The winter stores must be of good quality. Most beekeepers feed one or two 10-pound pails of syrup to each colony late in the fall. Those who winter in cellars do not have the problem of packing their bees in the fall. The food consumption is lower than it is with outside wintered bees.

I should like to have had more time to spend with some of the commercial beekeepers in northern New York, to find out just how they manage their bees throughout the season.

One reason some of us do not improve our methods of apiary management is that beekeeping is a seasonal business and we are so busy during the height of the season attending to our own bees that we do not find time to visit other beekeepers to find out how they do things.

(to be continued)



Left to right: Arthur Wahl, Clayton, N. Y., Wilbur Wahl, Clayton, N. Y., Roy French, Theresa, N. Y., Raymond Churchill, Watertown, N. Y., Clare Newton, Watertown. N. Y., Dr. W. L. Coggshall, Cornell University, Michael Boczko, Lisbon, N. Y.

Buy and Sell

Only responsible advertisers and honest advertisements will be admitted to these columns. References required from new advertisers not known to us. Rate: 15c per counted word, each insertion. Each initial, each word in names and addresses, the shortest word such as "a" and the longest word possible for the advertiser to use, as well as any number (regardless of how many figures in it), count as one word. Copy should be in by the 10th of the month preceeding publication.

HONEY FOR SALE

WE BUY AND SELL all varieties of honey. Any quantity. Write us for best prices obtainable. The Hubbard Apiaries, Onsted, Michigan.

IOWA honey, one can or truck loads. Russell D. Smalley, Beaver, Iowa.

CLOVER extracted honey in sixties. Abram Brubaker, Lancaster, Pa., Rt. 2.

Michigan's finest raspberry, basswood, clover comb honey, in 4 x 5 window cartoned sections. Extra Fancy, $8.00; Fancy, $7.00; No. 1, $6.00; No. 2, $5.00 case. E. Z. Quick Way B Farms, Boyne Falls, Mich.

Light clover honey. 60's, $10.20; 10, $9.90 each. Harris Bee Supply Jackson, Tenn.

HONEY FOR SALE. Write for prices. Lloyd E. Allen, Tipton, Mich.

HONEY FOR SALE—Mild heavy clover-alfalfa, 20,000 pound lot packed in new sixties having larger opening. Will send sample before consummation of sale. Write. Wayne Keller, Oshkosh, Nebr.

FINE QUALITY Chunk Comb Honey in one pound jars. Hiltner's Apiaries, North Creek, Ohio.

COMB HONEY for sale—Buckwheat and goldenrod in carriers of eight cases. Edgar Williams, Pierpont, Ohio.

HONEY white clover strained, 18c per pound in sixties. LOSE BROTHERS, Inc., 204-206 E. Jefferson St., Louisville, Ky.

ASK FOR SAMPLE and price Water White Clover Honey. The Hubbard Apiaries, Mfgrs. Bee Supplies & Comb Foundation, Onsted, Michigan.

HONEY AND WAX WANTED

BEEKEEPERS TAKE NOTICE—We can not guarantee honey buyers' financial responsibility, and advise all beekeepers to sell for cash only or on C.O.D. terms except where the buyer has thoroughly established his credit with the seller.

CASH for your comb honey and all types extracted. Send sample and best price. Buckeye Honey Co., 3930 No. High St., Columbus 14, Ohio.

CASH for Beeswax. Write as to quantity and we will quote price. Muench-Kreuzer Candle Co., Inc., Syracuse, N. Y.

HONEY WANTED — All grades and varieties. Highest cash prices paid. Mail samples. State quantity. HAMILTON & COMPANY, 2613 South Yates Ave., Los Angeles 22, California.

CASH FOR YOUR HONEY—Light extracted or comb. Regular trade send sample. W. R. Moomaw, Stone Creek, O.

WRITE FOR shipping tags and quotations on rendered beeswax. We buy from one pound up and if you have over 25 pounds let us work it into foundation for you at a 25 per cent saving. Walter T. Kelley Co., Clarkson, Kentucky.

HONEY WANTED for cash. All grades. Good used cans for sale or trade for honey. John Tideswell, 2711 North 63 St., Omaha, Nebraska.

WANTED — White extracted or comb honey. Send sample. Millersport Honey Co., Millersport, Ohio.

HONEY WANTED, all grades in 60's. Mail samples, advise quantity, best price. A. I. Root Company of Syracuse, 1112-14 E. Erie Blvd., Syracuse, N. Y.

WANTED — Honey, all grades. Quote prices and send sample. Write Stoller Honey Farms, Latty, Ohio.

WANTED—Light amber-clover and fall-flowers honey. Cloverdale Honey Co., Fredonia, N. Y.

BEST CASH DEAL for your honey (any grade) and beeswax. Alexander Company, 819 Reynolds Road, Toledo, Ohio.

WANTED—white and amber extracted honey, car loads or less. Write, stating best price. Honeymoon Products Co., 39 E. Henry St., River Rouge, Mich.

WANTED—Raspberry honey in 60-pound cans, also buckwheat. Lloyd E. Allen, Tipton, Mich.

WANTED—Buckwheat honey. Eastern Food Products, 115 Division Ave., Brooklyn, N. Y.

All kinds honey wanted. Wm. March, R. D. 3, Mantua, Ohio.

WANTED: All grades of extracted honey. Send sample and price. Deer Creek Honey Farms, London, Ohio.

WAX WORKERS, 1330 Slaterville Road, ITHACA, N. Y., will render your wax, then buy it or make it into foundation for you at reasonable prices.

WILL BUY two carloads fancy white honey. Send sample and quote. Maxwell's, Berryville, Va.

FOR SALE

QUEENBEE PAINTING OUTFITS, $1.50 postpaid. Southwick Apiaries. Waban, Massachusetts.

WRITE FOR CATALOG — Quality Bee supplies at factory prices. Prompt shipment. Satisfaction guaranteed. The Hubbard Apiaries. Manufacturers of Beekeepers' Supplies and Comb Foundation. Onsted, Michigan.

THE BIGGEST BEE SUPPLY Catalog published (64 pages) free for the asking. Listing many items not found in other Catalogs. No agents—buy direct and save 20%. WALTER T. KELLEY CO., CLARKSON, KENTUCKY.

FOR SALE — New heart cypress 10-frame bottom boards. K.D., 10 or more, $1.00 each; 50 or more, 90 cents each; 100 or more, 85 cents each. One nailed up sample postpaid, $1.25. Fred L. Poole, Elizabethtown, Rt. 2, Box 67, No. Car.

ELECTRO Filling Machines, users and distributors. Write Stoller Honey Farms, Latty, Ohio.

NOW AVAILABLE, Fumigil for control of Nosema disease in bees. Write for prices and circular by Abbott's Laboratories. PRAIRIE VIEW HONEY CO., 12303 12th Street, Detroit 6, Michigan.

ROSEDALE UNCAPPING PLANES; NOW DUTY FREE—Speedy uncapping—easy to handle—adjustable depth of cut. Satisfactory performance fully guaranteed for one year. Rosedale Co., 509 Rupertsland Ave., Winnipeg, Canada.

WINTER CASES, 50 two-colony packing, in good condition. Ray Wilcox, Odessa, New York.

FOR SALE — 1000 eight-frame supers with frames. Sterilized. In very good condition. E. H. Wadleigh, Monte Vista, Colorado.

FOR SALE—Equipment for 50 colonies. 15 inspected double brood colonies with winter stores. 45 Simplicity extractor, melter, uncapping machine, accessories. Excellent condition. Price reasonable. A. G. Ostermoor, Holmes, New York.

FOR SALE: Eight-frame equipment. hive bodies, covers, bottoms, queen excluders, and division-board feeders, no bees, for 300 colonies. Also boiler, 30-frame Woodman extractor, two 4-ft. honey tanks, 24 x 48 honey house, and six locations for bees. Will sell all or part. Reasonable. Apply or write to Harold H. Ruthig, Pigeon, Michigan.

BEES AND QUEENS FOR SALE

We use all possible care in accepting advertisements but we cannot be held responsible in case disease occurs among bees sold or if dissatisfaction occurs. We suggest that prospective buyers ask for a certificate of inspection as a matter of precaution.

CAUCASIANS. 2-lb. pkg., $3.00; 3-lb. pkg., $4.00. Untested queens, $1.00 each; 100, $75.00. Lewis & Tillery Bee Co., Greenville, Ala.

ITALIAN PACKAGE BEES, QUEENS: Gargain grade beekeepers' supplies. Circular. Crenshaw County Apiaries, Rutledge, Ala.

FOR SALE—BEES. 10 doubles and one single hive. 147 comb supers, 10 pounds medium brood, 25 pounds rendering comb, 29 empty hives, 50 queen excluders. Must sell now. Everett Beckett, R. 2, Bridgeville, P. O. Brooksville, Ky.

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Carloads and less than carloads. Mail sample and best prices in all grades.
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Improved designs, embodying color, balance, simplicity, and distinction. Please send for free samples & prices.
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Oconomowoc, Wisconsin

We Thank You

for the nice queen business given us this summer. We regret that we are having to close down our queen yards for the remainder of the season. This is due to the extreme drouth and its effect on bees in this immediate locality.

We will be ready again in the spring with both our Regular and Island Hybrid bees and queens.

"They Produce"

Rossman Apiaries

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JOHN DAVIS QUEENS

We ship until November 1 and fall is the right time to requeen. Order now and be sure. $1.00 each, any number.

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J. E. WING & SONS

41 Years Continuous Service

Italian Package Bees and Queens

Our Specialty

Knights Landing, Calif.

BETTER BRED QUEENS

Three Banded Italians

We wish to thank our many customers for the business they have given us this year. Hoping to serve you in 1955.

CALVERT APIARIES **Calvert, Ala.**

Package Bees & Queens

Quality & Service

C. F. KOEHNEN & SONS

Glenn, California

FOR SALE—15 strong comb production bred two-story colonies, inspected, young queens, reasonable. Albert Ihlefeld, Davenport, Iowa, Rt. 4.

FOR SALE—25 to 275 colonies with or without locations, supers etc. Low fall price. Roger C. Lane, Trumansburg, R. D. 3, New York.

FOR SALE—35 colonies bees in 10-frame hives, four-frame extractor, 40-gallon tank, electric knife, large quantity supplies, half price. Complete list on request. John Maul, Hamlet, N. C.

I AM RETIRING from commercial beekeeping because of an incredible opportunity I have in writing on our ideals and teaching. Will sell Florida outfit with plans, locations, trucks, hives, and bees now or after the orange flow. Box 504 Winter Haven, Florida.

HELP WANTED

HELP WANTED: for 1955. Give experience, references, age and height. Do not apply if you drink. Also: Bees on share basis to right party. Howard Weaver, Navasota, Texas.

SEEDS

HONEY PLANTS our specialty. Catalog on request. Pellett Gardens, Atlantic, Iowa.

MISCELLANEOUS

HAVE FOR SALE and WANT TO BUY used extractors of all kinds. John Layman, 702 West 6th St., Bloomington, Ind.

Bargains in new or used honey cans or Root Supplies for cash or honey. Buckeye Honey Company, 3930 N. High St., Columbus 14, Ohio.

PINKING SHEARS—ONLY $1.95 postpaid. Chromium plated, precision made. Manufacturer's Christmas Overstock. Guaranteed $7.95 value or money refunded. Order by mail. Lincoln Surplus Sales, 1704 W. Farwell Ave., Chicago 26, Illinois.

SECTION COMB HONEY production steps—$1.00. Comb Honey Production Glossary—50c. United Industries, Dept. L, Box 449, Madison 1, Wis.

Tested formula for a new kind light pure bee honey which makes it much different in Taste and Aroma and far superior in Health quality. This improved honey has a new and strong sales appeal. Exclusive rights to formula and all sales territory east or west of Mississippi river. Price $950. R. Linse, 5518 North 6, Philadelphia, Pa.

MAGAZINES

Know interesting facts concerning the bees of India through the INDIAN BEE JOURNAL, published in English by the Bhupen Apiaries (Himalayas), Ramgarrh Dist. Naini Tal, U. P. India, or available through them. Subs. Rs9/ or 15 shillings or $2.25 yearly. Sample copy post free for Rs½/, or s2/6, or 40 cents (International Money Order). Payment in mint postage stamps of your country accepted.

ARCHIVE of BEE SCIENCE (Archive fur Bienenkunde), oldest scientific, independent bee journal in the world. Select feature material gives lasting theoretical and practical knowledge. Sample copies available. Two large 1953 editions for the

low price of DM 5.50. Biene-Verlag (Bee Publishers), Lindau (B), Postcheck Karlsruhe 5581, Germany.

BEE WORLD, the international journal of the Bee Research Association, published monthly, contains the latest research reports on bees and beekeeping. With **Apicultural Abstracts** it costs $3.00 per annum. **Apicultural Abstracts** only $1.75 per annum from the Hon. Subscription Secretary, Bee Research Association, 10 Barnett Wood Lane, ASHTEAD, Surrey, England.

Read the South African Bee Journal. Published every two months. Subscription 7/6 per year to the Treasurer, P. O. Box 3306, Cape Town, South Africa.

DO YOU FIND it difficult to secure information about sheep and sheep ranching methods, The SHEEP AND GOAT RAISER reaches more sheepmen with more information on range sheep than any other magazine published. Subscription $1.00. Hotel Cactus, San Angelo, Tex.

THE PACKING SYSTEM

(Continued from page 655)

nature, until it reaches a temperature of 130° to 135° F. The honey is then forced from the kettle by compressed air through a special stainless steel strainer. The strainer has two cylindrical units—one inside the other, one of 86-mesh wire cloth and the other 100-mesh wire cloth. From the strainer, the honey reaches the Booster pasteurizer. This consists of a series of pipes (approximately 80 ft.) inside a heavy steel cylinder. The honey travels up and down the pipes while surrounded by hot water steam. Pasteurization temperature of 165° to 170° F. is soon reached and can be automatically controlled. Special attention is drawn to the removing of most foreign material before giving the honey the final pasteurizing temperature.

After pasteurizing the honey must be cooled quickly. This is accomplished by two large stainless steel drums (three feet diameter, six feet long) revolving slowly in a shallow bath of honey. Cold water is sprayed on inside of the drum, chilling the honey and a knife edge scrapes this thick honey off the surface of the drum. The temperature drops about 80° F. in less than half a minute.

The cooled honey runs to the seeding vats and the seed (smooth granulated honey) is agitated or mixed very slowly. The seeded honey drops by gravity to the filling room on the floor below. It is interesting to note that only one pump is used in the entire system. This is at the beginning of the process. From that point on all honey is handled either by air pressure or gravity flow.

Honey is filled into containers of one, two, and four pound size. Paper tubs are used in one and two pound, while metal or tin is used for two and four pound sizes. These are packed to a standard of 24 to a case, except the four pound which is packed 12. The packed honey is placed in the controlled storage rooms (57° F.) where it sets with that fine smooth granulation in eight to ten days.

Daily capacity of this plant is approximately 12,000 pounds in one-pound containers or double this amount if honey is packed in four-pound size.

CAUCASIAN BEES and QUEENS for 1955

Thanks to my many friends and customers who sent their orders my way.

Howard Weaver

Navasota, Texas

QUALITY BRED QUEENS

$1.00 each $10.80 per doz.
Airmail

Will have package bees for spring. Write for information.

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Box 364
Fort Pierce, Florida

If you are taking time to read, why not read the best? Condensed to save you time. Illustrated to give you pleasure.

Modern Beekeeping
The Picture Bee Magazine
Box 210 Clarkson, Kentucky

"Sue Bee Says". We can save you money on your wax rendering. We now have complete rendering facilities at Sioux City, Iowa and Rogers, Texas. Prompt service will be given to your cappings, slumgum and old combs.

We carry a complete line of quality foundation, woodenware, containers, cyanide gas, carbolic acid, fumadil B, etc.

We are always in the market for your beeswax, paying market price in cash or trade.

SIOUX HONEY ASSOCIATION

Rogers, Texas **Anaheim, California**

Lima, Ohio **Tacoma, Washington**

Sioux City, Iowa

Good Italian Queens
$1.00 each
WHITE PINE BEE FARMS
Rockton, Pa.

JUST NEWS

(Continued from page 693)

The **Minnesota Beekeepers' Association** will hold its annual meeting on Dec. 4, at the St. Francis Hotel in St. Paul. A group luncheon will be held at noon and the banquet will be held the evening of the 4th. Several out-of-state speakers are expected to attend. Election of officers and Federation Directors will take place at this meeting. All interested in beekeeping are invited.—Robert Banker, Sec'y.-Treas.

The annual business meeting of the **Michigan Beekeepers' Association** will be held on Saturday, December 11th, in Room 33 of the Union Building at Michigan State College, East Lansing. The meeting will begin at 10 a.m. —E. C. Martin, Program Committee.

Mrs. H. F. York, Sr., passed away on October 10 after an illness of several months at the age of 55. She is survived by Mr. H. F. York, Sr., one son, Harvey F. York, Jr., one daughter, and three grand children.

Rt. Rev. Msgr. Alois J. Klein, Brainard, Nebraska, passed away on July 2, 1954, at the age of 88. Monsignor Klein had been a beekeeper much of his life and a subscriber to Gleanings for nearly 35 years. Just two weeks before he died Monsignor Klein celebrated the 65th anniversary of his ordination. He had been pastor of Holy Trinity parish, in Brainard, since 1893, although he had charge of Brainard as a mission for four years previous. His was a long and fruitful priestly career.

Dr. O. W. Park, Ames, Iowa, died October 16. Word received just as we go to press.

New Publications. — "Bees to the Heather", by Stanley B. Whitehead, describes the proper management for heather honey production. This 96-page book is published by Faber & Faber Ltd., 24 Russell Square, London, England.

"Insects and the Homes They Build" is a lively guide to the ways of honey bees as well as many other nest-building insects. The author, Dorothy Sterling, vividly describes the different insects that build with silk, bubbles, mud, paper, plants, wood, and wax. The excellent photographs of the honey bees were taken by Myron Ehrenberg with the cooperation of Mr. Alfred A. Roth, president of the Westchester County (N. Y.) Beekeepers' Association. This very entertaining book should be a part of every nature lover's library. Copies sell for $2.50 each and can be purchased from Doubleday & Co., 575 Madison Avenue, New York 22, N. Y.

LET'S TALK ABOUT HONEY PLANTS

(Continued from page 677)

the base of each leaf. The bees were undoubtedly getting pollen from the flowers as it is generally agreed that the only nectar is in the cups on the leaves.

Several Florida beekeepers report s m a l l surpluses from partridge-pea. The honey is described as thin, yellow, and s t r o n g. It is sold mostly to bakeries.

Montana. Ned Dressel, of Rowan, writes that he sometimes finds his bees working on a species of wild garlic. "Ordinarily", he states, "honeybees cannot reach the nectar because of the deep tube of the blossom. However, sometimes bumblebees chew a hole in the back of the blossoms and work the flowers. Honey bees come along and utilize this hole made by the bumblebees to obtain the nectar."

There are a good many flowers with deeply concealed nectar that occasionally become available to honey bees through this means. Many years ago my father discovered honey bees "stealing" the nectar through punctures of the tubes on jewelweed, made by bumblebees too "lazy" to visit the flowers properly. I have observed this frequently in Virginia bluebells, and recently in the commonly cultivated s h r u b Abelia. Sometimes the holes are cut by carpenter bees instead of bumblebees.

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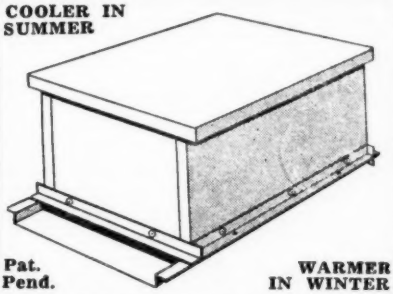

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THE STOVER APIARIES

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KNOW YOUR HONEY

(Continued from page 667)

than 15 uncapped cells in the row adjoining the outside row.

b. There shall not be more than four linear inches of through holes.

Comb must be fairly uniform and white in color. Slight irregularities must not affect more than one half the comb surface. Each comb should weigh not less than 11 ounces. Other characteristics are the same as Fancy.

III. Standards for U. S. No. 2.

a. Comb shall have not more than 30 uncapped cells in the row next to outside row.

b. - c. Same as Fancy.

d. Comb shall have no dry holes larger than three eighths inch across nor more than six linear inches of through holes.

e. Comb should be free from serious numbers of pollen cells.

Comb should be free from serious damage as in Fancy, but there is no requirement as to uniformity in color. Comb sections should weigh at least ten ounces each.

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I. Standards for U. S. Fancy.

a. Comb shall be drawn out on foundation and light in color comparing favorably with comb-section honey.

b. There shall be no uncapped cells except along cut edges.

c. Comb should never have contained brood, and should contain no dry holes or cells of pollen.

d. Comb must be free from weeping due to damage.

Color should be white and uniform.

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PULVERIZED SULFA AND AFB

(Continued from page 651)

replace; dust well over the frame tops, replace super if any and close up the hive. It takes only five minutes to do the whole; but of course double brood chambers would take longer.

One treatment will, I have found, result in a cure; but I would recommend two at a 10-days' interval. So far every colony treated in this way has become sound and has remained so till now. Time only can tell if the cure is permanent; but Mr. Deans told me a year ago that he had treated 400 colonies without a single failure during the five preceding years.

The interesting part of all this is that theoretically this disease cannot be cured by drugs because the spores are so extremely resistant that they are for all intents and purposes indestructible except by fire. We are constantly having it hammered into us that since this is the case, all these apparent cures are necessarily spurious because the spores lying in the combs must reproduce the disease as soon as the bees come back on the infected stores. But it does not seem to be so. There **must be** an explanation; but what that explanation may be I do not know. All I can say for certain is that diseased stocks that have been treated with this drug have become sound and have remained so in several cases for six years.

This dusting plan seems to call for an explanation, and I believe myself that as all the bees become carriers of this pulverized sulfa, they convey it into every cell in the hive and, when they empty cells of sealed stores, transferring it as they do to other cells, this food becomes impregnated before being fed to larvae. The spores which are presumably contained in the larval food are then transformed into bacteria which in this medium are unable to live and reproduce. I see no other explanation of what are undoubtedly complete and permanent cures.

BEE FACTS

(Continued from page 675)

bees by a screen. The drones received a 50 per cent sucrose syrup while the workers received a similar but radioactive (C14) syrup. After three hours all bees were killed and examined for radioactivity. Both workers and drones were radioactive—the workers 20 times more so than the drones.

Apparently the workers must have fed the drones. Whether this is from (1) "choice" or (2) whether the drones receive more than merely regurgitated syrup from the workers or (3) whether drones cannot invert sucrose as readily as workers, is not known. Drones appear to live longer on levulose-sucrose syrup than they do on dextrose-levulose, or dextrose-sucrose, or sucrose alone.

Reference: Oertel, E., Emerson, R., and Wheeler, H. Transfer of Radioactivity from Worker to Drone Honeybees after Ingestion of Radioactive Sucrose. Annals Ent. Soc. America 46:596(Dec.) 1953.

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